INSTALLATION MANUAL

Unit for air to water heat pump system

EDHQ011AA6V3
EDHQ014AA6V3
EDHQ016AA6V3

EDHQ011AA6W1
EDHQ014AA6W1
EDHQ016AA6W1

EDLQ011AA6V3
EDLQ014AA6V3
EDLQ016AA6V3

EDLQ011AA6W1
EDLQ014AA6W1
EDLQ016AA6W1

EBHQ011AA6V3
EBHQ014AA6V3
EBHQ016AA6V3

EBHQ011AA6W1
EBHQ014AA6W1
EBHQ016AA6W1

EBLQ011AA6V3
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EBLQ011AA6W1
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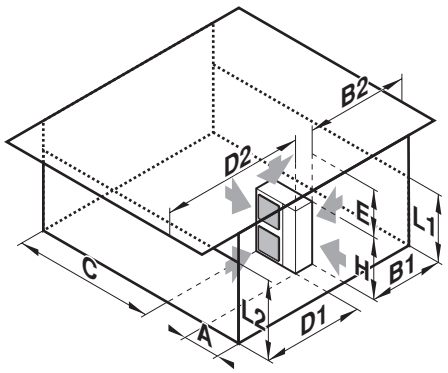
EBLQ016AA6W1



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						L2<L1			≥100			≥500			
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												≥1000			0<L1≤1/2H
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						L2<L1	L2≤H		≥100			≥1000	≥500	≥1000	0<L2≤1/2H
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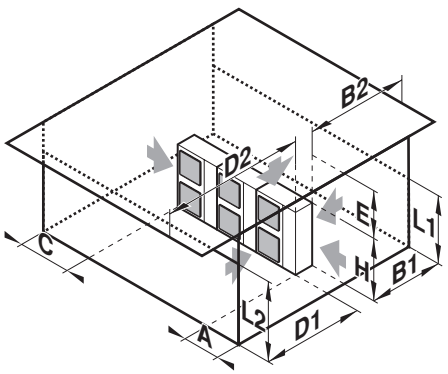

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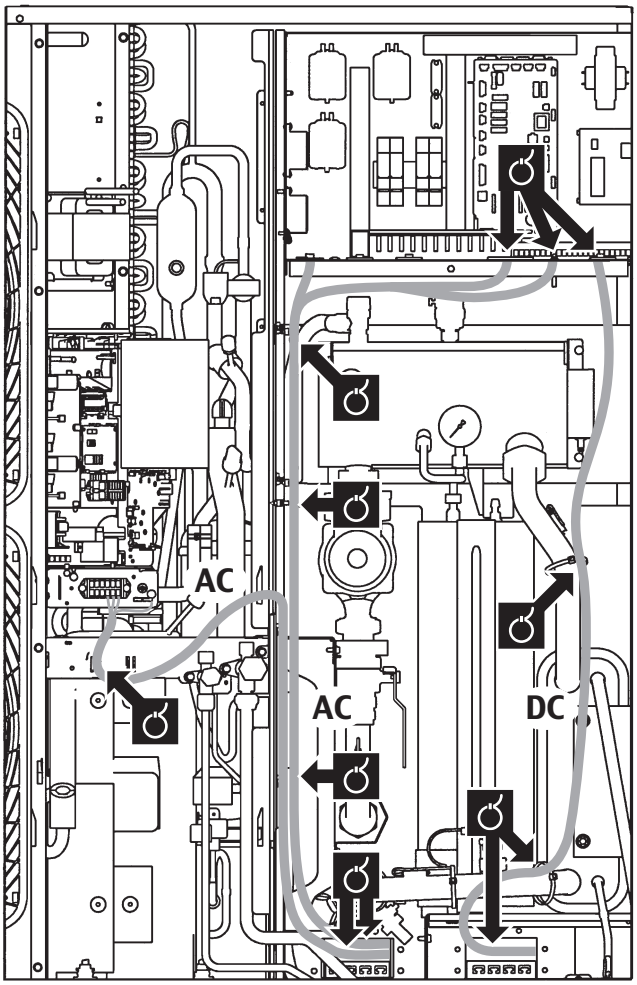
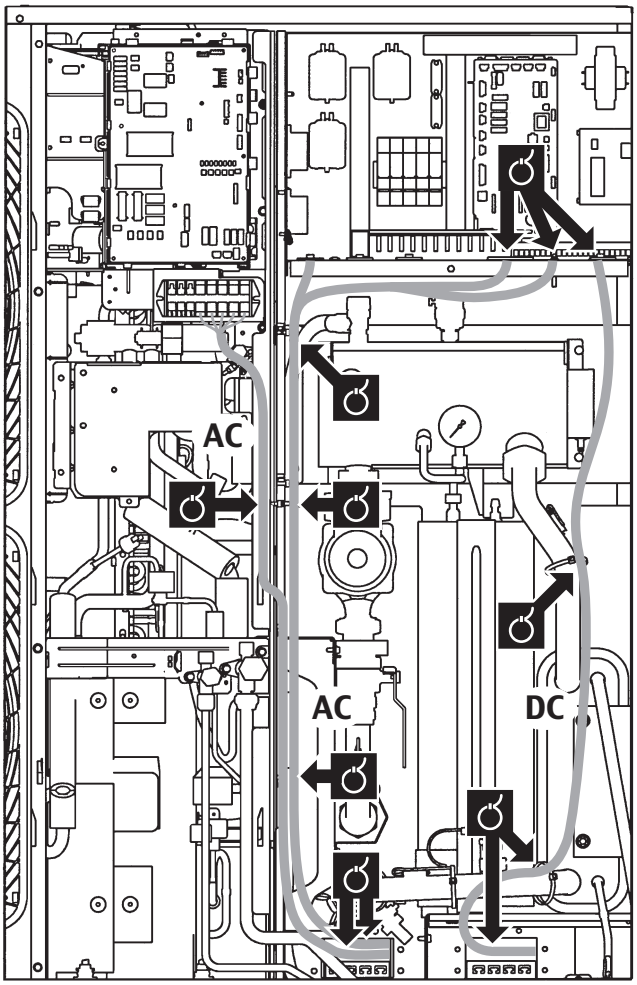
V3



W1



2

CE - DECLARATION-OF-CONFORMITY
CE - KONFORMITÄTSERKLÄRUNG
CE - DECLARATION-DE-CONFORMITE
CE - CONFORMITEITSVERKLARING

CE - DECLARACION-DE-CONFORMIDAD
CE - DICHIARAZIONE-DI-CONFORMITA
CE - ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ

CE - DECLARAÇÃO-DE-CONFORMIDADE
CE - ЗАЯВЛЕНИЕ-О-СООТВЕТСТВИИ
CE - OPFYLDELSESERKLÆRING
CE - FÖRSÄKRAN-OM-ÖVERENSTÄMMELSE

CE - ERKLÆRING OM-SAMSVAR
CE - ILMOITUS-YHDENMUKAISUUDESTA
CE - PROHLÁŠENÍ-O-SHODĚ

CE - IZJAVA-O-USKLAĐENOSTI
CE - MEGFELELŐSÉGI-NYILATKOZAT
CE - DEKLARACJA-ZGODNOŚCI
CE - DECLARAŢIE-DE-CONFORMITATE

CE - IZJAVA O SKLADNOSTI
CE - VASTAVUSDEKLARATSIOON
CE - ДЕКЛАРАЦИЯ-ЗА-СЪОТВЕТСТВИЕ

CE - ATITIKTIES-DEKLARACIJA
CE - ATBILSTĪBAS-DEKLARĀCIJA
CE - VYHLÁSENIE-ZHODY
CE - UYUMLULUK-BİLDİRİSİ

Daikin Europe N.V.

01 (GB) declares under its sole responsibility that the equipment to which this declaration relates:
02 (D) erklärt auf seine alleinige Verantwortung, dass die Ausrüstung für die diese Erklärung bestimmt ist:
03 (F) déclare sous sa seule responsabilité que l'équipement visé par la présente déclaration:
04 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de apparatuur waarop deze verklaring betrekking heeft:
05 (E) declara bajo su única responsabilidad que el equipo al que hace referencia la declaración:
06 (I) dichiara sotto la propria responsabilità che gli apparecchi a cui è riferita questa dichiarazione:
07 (GR) δηλώνει με αποκλειστική της ευθύνη ότι ο εξοπλισμός στον οποίο αναφέρεται η παρούσα δήλωση:
08 (P) declara sob sua exclusiva responsabilidade que os equipamentos a que esta declaração se refere:
09 (RUS) заявляет, исключительно под свою ответственность, что оборудование, к которому относится настоящее заявление:
10 (DK) erklærer som eneansvarlig, at udstyret, som er omfattet af denne erklæring:
11 (S) deklarerar i egenskap av huvudansvarig, att utrustningen som berörs av denna deklaration innebär att:
12 (N) erklærer et fullstendig ansvar for at det utstyr som berøres av denne deklarasjon, innebærer at:
13 (FIN) ilmoittaa yksinomaan omalla vastuullaan, että tämän ilmoituksen tarkoittamat laitteet:
14 (CZ) prohlašuje ve své plné odpovědnosti, že zařízení, k němuž se toto prohlášení vztahuje:
15 (HR) izjavljuje pod isključivo vlastitom odgovornošću da oprema na koju se ova izjava odnosi:
16 (H) teljes felelössége tudatában kijelenti, hogy a berendezések, melyekre e nyilatkozat vonatkozik:
17 (PL) deklaruje na własną wyłączną odpowiedzialność, że urządzenia, których ta deklaracja dotyczy:
18 (RO) declară pe proprie răspundere că echipamentele la care se referă această declaraţie:
19 (SLO) z vso odgovornostjo izjavlja, da je oprema naprav, na katero se izjava nanaša:
20 (EST) kinnitab oma täielikul vastutusel, et käesoleva deklaratsiooni alla kuuluv varustus:
21 (BG) декларира на своя отговорност, че оборудването, за което се отнася тази декларация:
22 (LT) visiška savo atsakomybe skelbia, kad įranga, kuriai taikoma ši deklaracija:
23 (LV) ar pilnu atbildību apliecina, ka tālāk aprakstītās iekārtas, uz kurām attiecas šī deklarācija:
24 (SK) vyhlasuje na vlastnú zodpovednosť, že zariadenie, na ktoré sa vzťahuje toto vyhlásenie:
25 (TR) tamamen kendi sorumluluğunda olmak üzere bu bildirinin ilgili olduğu donanımının aşağıdaki gibi olduğunu beyan eder:

EDLQ011AA6V3, EDLQ011AA6W1, EDLQ014AA6V3, EDLQ014AA6W1, EDLQ016AA6V3, EDLQ016AA6W1, EDHQ011AA6V3, EDHQ011AA6W1, EDHQ014AA6V3, EDHQ014AA6W1, EDHQ016AA6V3, EDHQ016AA6W1, EBLQ011AA6V3, EBLQ011AA6W1, EBLQ014AA6V3, EBLQ014AA6W1, EBLQ016AA6V3, EBLQ016AA6W1, EBHQ011AA6V3, EBHQ011AA6W1, EBHQ014AA6V3, EBHQ014AA6W1, EBHQ016AA6V3, EBHQ016AA6W1,

01 are in conformity with the following standard(s) or other normative document(s), provided that these are used in accordance with our instructions:
02 der/den folgenden Norm(en) oder einem anderen Normdokument oder -dokumenten entspricht/entsprechen, unter der Voraussetzung, daß sie gemäß unseren Anweisungen eingesetzt werden:
03 sont conformes à la/aux norme(s) ou autre(s) document(s) normatif(s), pour autant qu'ils soient utilisés conformément à nos instructions:
04 conform de volgende norm(en) of één of meer andere bindende documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies:
05 están en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativo(s), siempre que sean utilizados de acuerdo con nuestras instrucciones:
06 sono conformi al(i) seguente(i) standard(s) o altro(i) documento(i) a carattere normativo, a patto che vengano usati in conformità alle nostre istruzioni:
07 είναι σύμφωνα με το(α) ακόλουθο(α) πρότυπο(α) ή άλλο έγγραφο(α) κανονισμών, υπό την προϋπόθεση ότι χρησιμοποιούνται σύμφωνα με τις οδηγίες μας:
08 estão em conformidade com a(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s), desde que estes sejam utilizados de acordo com as nossas instruções:
09 соответствуют следующим стандартам или другим нормативным документам, при условии их использования согласно нашим инструкциям:
10 overholder følgende standard(er) eller andet/andre retningsgivende dokument(er), forudsat at disse anvendes i henhold til vore instrukser:
11 respektive utrustning är utförd i överensstämmelse med och följer följande standard(er) eller andra normgivande dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner:
12 respektive utstyr er i overensstemmelse med følgende standard(er) eller andre normgivende dokument(er), under forutssetning av at disse brukes i henhold til våre instrukser:
13 vastaavat seuraavien standardien ja muiden ohjeellisten dokumenttien vaatimuksia edellyttäen, että niitä käytetään ohjeidemme mukaisesti:
14 za předpokladu, že jsou využívány v souladu s našimi pokyny, odpovídají následujícím normám nebo normativním dokumentům:
15 u skladu sa slijedećim standardom(ima) ili drugim normativnim dokumentom(ima), uz uvjet da se oni koriste u skladu s našim uputama:
16 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják:
17 spełniają wymogi następujących norm i innych dokumentów normalizacyjnych, pod warunkiem że używane są zgodnie z naszymi instrukcjami:
18 sunt în conformitate cu următorul (următoarele) standard(e) sau alt(e) document(e) normativ(e), cu condiţia ca acestea să fie utilizate în conformitate cu instrucţiunile noastre
19 skladni z naslednjimi standardi in drugimi normativi, pod pogojem, da se uporabljajo v skladu z našimi navodili:
20 on vastavuses järgmis(t)e standardi(te)ga või teiste normatiivsete dokumentidega, kui neid kasutatakse vastavalt meie juhenditele:
21 съответстват на следните стандарти или други нормативни документи, при условие, че се използват съгласно нашите инструкции:
22 atitinka žemiau nurodytus standartus ir (arba) kitus norminius dokumentus su sąlyga, kad yra naudojami pagal mūsų nurodymus:
23 tad, ja lietoti atbilstoši ražotāja norādījumiem, atbilst sekojošiem standartiem un citiem normatīviem dokumentiem:
24 sú v zhode s nasledovnou(ými) normou(ami) alebo iným(i) normatívnym(i) dokumentom(ami), za predpokladu, že sa používajú v súlade s našim návodom:
25 ürünün, talimatlarımıza göre kullanılması koşuluyla aşağıdaki standartlar ve norm belirten belgelerle uyumludur:

EN60335-2-40,

01 following the provisions of:
02 gemäß den Vorschriften der:
03 conformément aux stipulations des:
04 overeenkomstig de bepalingen van:
05 siguiendo las disposiciones de:
06 secondo le prescrizioni per:
07 με τήρηση των διατάξεων των:
08 de acordo com o previsto em:
09 в соответствии с положениями:
10 under iagttagelse af bestemmelserne i:
11 enligt villkoren i:
12 gitt i henhold til bestemmelsene i:
13 noudattaen määräyksiä:
14 za dodržení ustanovení předpisu:
15 prema odredbama:
16 követi a(z):
17 zgodnie z postanowieniami Dyrektyw:
18 ťn urma prevederilor:
19 ob upoštevanju določb:
20 vastavalt nõuetele:
21 следвайки клаузите на:
22 laikantis nuostatų, pateikiamų:
23 ievērojot prasības, kas noteiktas:
24 održiavajúc ustanovenia:
25 bunun koşullanna uygun olarak:

Low Voltage 2006/95/EC
Machinery 98/37/EC
Electromagnetic Compatibility 2004/108/EC *

01 Directives, as amended.
02 Direktiven, gemäß Änderung.
03 Directives, telles que modifiées.
04 Richtlijnen, zoals geamendeerd.
05 Directivas, según lo enmendado.
06 Direttive, come da modifica.
07 Οδηγιών, όπως έχουν τροποποιηθεί.
08 Directivas, conforme alteração em.
09 Директив со всеми поправками.
10 Direktiver, med senere ændringer.
11 Direktiv, med företagna ändringar.
12 Direktiver, med foretatte endringer.
13 Direktivejä, sellaisina kuin ne ovat muutettuina.
14 v platném znění.
15 Smjernice, kako je izmijenjeno.
16 irányelv(ek) és módosításaik rendelkezéseit.
17 z późniejszymi poprawkami.
18 Directivelor, cu amendamentele respective.
19 Direktive z vsemi spremembami.
20 Direktiivid koos muudatustega.
21 Директиви, с техните изменения.
22 Direktyvose su papildymais.
23 Direktīvās un to papildinājumos.
24 Smernice, v platnom znení.
25 Değiştirilmiş halleriyle Yönetmelikler.

01 Note * as set out in **<A>** and judged positively by **<B>** according to the **Certificate <C>**.
02 Hinweis * wie in der **<A>** aufgeführt und von **<B>** positiv beurteilt gemäß **Zertifikat <C>**.
03 Remarque * tel que défini dans **<A>** et évalué positivement par **<B>** conformément au **Certificat <C>**.
04 Bemerk * zoals vermeld in **<A>** en positief beoordeeld door **<B>** overeenkomstig **Certificaat <C>**.
05 Nota * como se establece en **<A>** y es valorado positivamente por **<B>** de acuerdo con el **Certificado <C>**.
06 Nota * delineato nel **<A>** e giudicato positivamente da **<B>** secondo il **Certificato <C>**.
07 Σημείωση * όπως καθορίζεται στο **<A>** και κρίνεται θετικά από το **<B>** σύμφωνα με το **Πιστοποιητικό <C>**.
08 Nota * tal como estabelecido em **<A>** e com o parecer positivo de **<B>** de acordo com o **Certificado <C>**.
09 Примечание * как указано в **<A>** и в соответствии с положительным решением **<B>** согласно **Свидетельству <C>**.
10 Bemærk * som anført i **<A>** og positivt vurderet af **<B>** i henhold til **Certifikat <C>**.
11 Information * enligt **<A>** och godkänts av **<B>** enligt **Certifikatet <C>**.
12 Merk * som det fremkommer i **<A>** og gjennom positiv bedømmelse av **<B>** ifølge **Sertifikat <C>**.
13 Huom * jotka on esitetty asiakirjassa **<A>** ja jotka **<B>** on hyväksynyt **Sertifikaatin <C>** mukaisesti.
14 Poznámka * jak bylo uvedeno v **<A>** a pozitivně zjištěno **<B>** v souladu s **osvědčením <C>**.
15 Napomena * kako je izloženo u **<A>** i pozitivno ocijenjeno od strane **<B>** prema **Certifikatu <C>**.
16 Megjegyzés * a(z) **<A>** alapján, a(z) **<B>** igazolta a megfelelést, a(z) **<C>** **tanúsítvány** szerint.
17 Uwaga * zgodnie z dokumentacją **<A>**, pozytywną opinią **<B>** i **Świadectwem <C>**.
18 Notă * aşa cum este stabilit în **<A>** şi apreciat pozitiv de **<B>** în conformitate cu **Certificatul <C>**.
19 Opomba * kot je določeno v **<A>** in odobreno s strani **<B>** v skladu s **certifikatom <C>**.
20 Märkus * nagu on näidatud dokumendis **<A>** ja heaks kiidetud **<B>** järgi vastavalt **sertifikaadile <C>**.
21 Забележка * както е изложено в **<A>** и оценено положително от **<B>** съгласно **Сертификата <C>**.
22 Pastaba * kaip nustatyta **<A>** ir kaip teigiamai nuspręsta **<B>** pagal **Sertifikatą <C>**.
23 Piezīmes * kā norādīts **<A>** un atbilstoši **<B>** pozitīvajam vērtējumam saskaņā ar **sertifikātu <C>**.
24 Poznámka * ako bolo uvedené v **<A>** a pozitívne zistené **<B>** v súlade s **osvedčením <C>**.
25 Not * **<A>**'da belirtildiği gibi ve **<B>** tarafından olumlu olarak değerlendirildiği gibi **<C>** **Sertifikasına** göre.

<A>	**DAIKIN.TCF.025C14/11-2008**
<B>	**KEMA (NB0344)**
<C>	**2082543.0551-QUA/EMC**

3PW33163-2B

DAIKIN

Jiro Tomita
Director Quality Assurance
Ostend, 1st of February 2009

DAIKIN EUROPE N.V.
Zandvoordestraat 300, B-8400 Oostende, Belgium

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READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION. KEEP THIS MANUAL IN A HANDY PLACE FOR FUTURE REFERENCE.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

The English text is the original instruction. Other languages are translations of the original instructions.

INTRODUCTION

General information

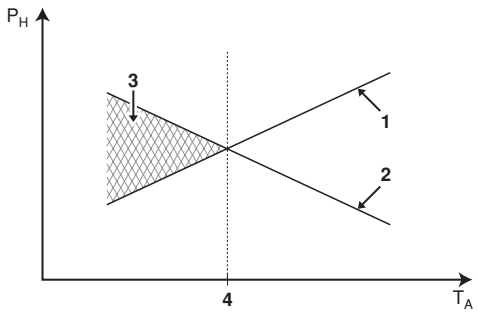
Thank you for purchasing this altherma by DAIKIN outdoor monoblock unit.

These units are used for both heating and cooling applications. The units can be combined with Daikin fan coil units, floor heating applications, low temperature radiators, domestic water heating applications and solar kit for domestic hot water applications.

Heating/cooling units and heating only units

The altherma by DAIKIN outdoor monoblock unit range consists of two main versions: a heating/cooling (EB) version and a heating only (ED) version.

Both versions are delivered with an integrated backup heater for additional heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning of the unit and for freeze protection of the outside waterpiping during winter time. The backup heater factory set capacity is 6 kW, however, depending on the installation, the installer can limit the backup heater capacity to 3 kW/2 kW. The backup heater capacity decision is a mode based on the equilibriumtemperature, see scheme below.



1	Heat pump capacity
2	Required heating capacity (site dependent)
3	Additional heating capacity provided by the backup heater
4	Equilibriumtemperature (can be set through the user interface, refer to "Field settings" on page 21)
T_A	Ambient (outdoor) temperature
P_H	Heating capacity

Options

- Domestic hot water tank EKHW*

  An optional EKHW* domestic hot water tank with integrated 3 kW electrical booster heater can be connected to the unit. The domestic hot water tank is available in three sizes: 150, 200 and 300 litre.
- Drain kit EKDK04
- Bottom plate heater kit EKBPHT16Y
- Room thermostat kits EKRTW, EKRTR and EKRTETS
- Solar kit for domestic hot water tank EKSOLHW
- Remote alarm kit EKRP1H

To obtain more information concerning these option kits, please refer to dedicated installation manuals of the kits.

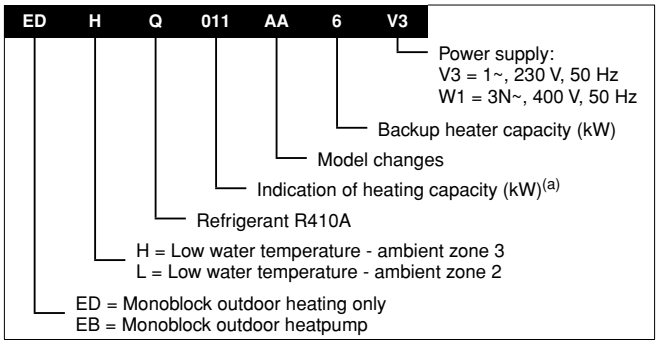
Connection to a benefit kWh rate power supply

This equipment allows for connection to benefit kWh rate power supply delivery systems. Full control of the unit will remain possible only in case the benefit kWh rate power supply is of the type that power supply is not interrupted. Refer to "Connection to a benefit kWh rate power supply" on page 17 for more details.

Scope of this manual

This installation manual describes the procedures for unpacking, installing and connecting all EDH, EDL, EBH and EBL outdoor unit models.

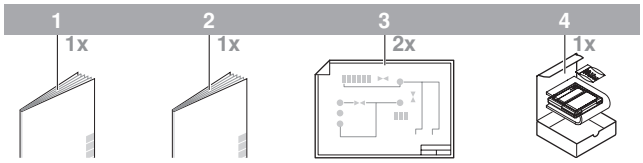
Model identification


ED H Q 011 AA 6 V3
Power supply:
V3 = 1~, 230 V, 50 Hz
W1 = 3N~, 400 V, 50 Hz
Backup heater capacity (kW)
Model changes
Indication of heating capacity (kW)(a)
Refrigerant R410A
H = Low water temperature - ambient zone 3
L = Low water temperature - ambient zone 2
ED = Monoblock outdoor heating only
EB = Monoblock outdoor heatpump

(a) For exact values, refer to "Technical specifications" on page 33.

ACCESSORIES

Accessories supplied with the unit



1	Installation manual
2	Operation manual
3	Wiring diagram sticker (inside unit cover doors 1 and 2)
4	User interface kit (digital remote controller, 4 fixing screws and 2 plugs)

SAFETY CONSIDERATIONS

The precautions listed here are divided into the following two types. Both cover very important topics, so be sure to follow them carefully.

WARNING
If the warning is not observed, it may cause serious casualties.

CAUTION
If the caution is not observed, it may cause injury or damage to the equipment.

Warning

- For use of units in applications with temperature alarm settings it is advised to foresee a delay of 10 minutes for signalling the alarm in case the alarm temperature is exceeded. The unit may stop for several minutes during normal operation for "defrosting of the unit" or when in "thermostat-stop" operation.
- Ask your dealer or qualified personnel to carry out installation work. Do not install the machine by yourself.

  Improper installation may result in water leakage, electric shocks or fire.
- Perform installation work in accordance with this installation manual.

  Improper installation may lead to water leakage, electric shocks or fire.
- Be sure to use only the specified accessories and parts for installation work.

  Failure to use the specified parts may result in water leakage, electric shocks, fire, or the unit falling.
- Install the unit on a foundation that can withstand its weight.
- Insufficient strength may result in the fall of equipment and causing injury.
- Carry out the specified installation work in consideration of strong winds, typhoons, or earthquakes.

  Improper installation work may result in accidents due to fall of equipment.
- Make certain that all electrical work is carried out by qualified personnel according to the local laws and regulations and this installation manual, using a separate circuit.

  Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Make sure that all wiring is secure, using the specified wires and ensuring that external forces do not act on the terminal connections or wires.

  Incomplete connection or fixing may cause a fire.
- When wiring the power supply, form the wires so that the frontside panel can be securely fastened.

  If the frontside panel is not in place, overheat of the terminals, electric shocks or a fire may be caused.
- After completing the installation work, check to make sure that there is no leakage of refrigerant gas.
- Before touching electric terminal parts, turn off power switch.
- Live parts can be easily touched by accident.

  Never leave the unit unattended during installation or servicing when the service panel is removed.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by frostbite.

Caution

- Earth the unit.

  Earthing resistance should be according to national regulations

  Do not connect the earth wire to gas or water pipes, lightning conductor or telephone earth wire.

  Incomplete earthing may cause electric shocks.

  - Gas pipe.
    Ignition or explosion may occur if the gas leaks.
  - Water pipe.
    Hard vinyl tubes are not effective earths.
  - Lightning conductor or telephone earth wire.
    Electric potential may rise abnormally if struck by a lightning bolt.
- Be sure to install an earth leakage circuit breaker.

  Failure to install an earth leakage circuit breaker may cause electric shocks and fire.
- Install the power wire at least 1 meter away from televisions or radios to prevent image interference or noise.

  (Depending on the radio waves, a distance of 1 meter may not be sufficient to eliminate the noise.)
- Do not rinse the unit. This may cause electric shocks or fire.
- Do not install the unit in places such as the following:
  - Where there is mist of mineral oil, oil spray or vapour.
    Plastic parts may deteriorate, and cause them to fall out or water to leak.
  - Where corrosive gas, such as sulphurous acid gas, is produced.
    Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.
  - Where there is machinery which emits electromagnetic waves.
    Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
  - Where flammable gases may leak, where carbon fiber or ignitable dust is suspended in the air or where volatile flammables, such as thinner or gasoline, are handled.
    Such gases may cause a fire.
  - Where the air contains high levels of salt such as that near the ocean.
  - Where voltage fluctuates a lot, such as that in factories.
  - In vehicles or vessels.
  - Where acidic or alkaline vapour is present.

BEFORE INSTALLATION

Installation

- Be sure to confirm the model name and the serial no. of the outer (front) plates when attaching/detaching the plates to avoid mistakes.
- When closing the service panels, take care that the tightening torque does not exceed 4.1 N•m.

Model

EDL and EBL units include special equipment (insulation, heater sheet,...) to ensure good operation in areas where low ambient temperature can occur together with high humidity conditions. In such conditions the EDH and EBH models may experience problems with severe ice build up on the aircooled coil. In case such conditions are expected, the EDL or EBL must be installed instead. These models contain countermeasures (insulation, heater sheet,...) to prevent freeze up.

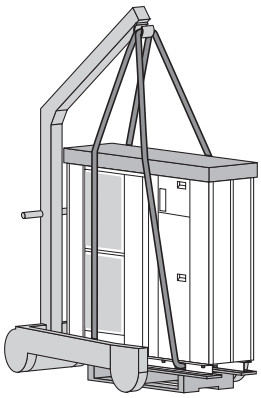
- Possible options

		Heater sheet	Drain socket
⚠	EDLQ, EBLQ	Standard	Use prohibited
	EDHQ, EBHQ	Optional kit[(a)]	Optional kit[(a)]

(a) Combination of both options is prohibited.

Handling

Due to relatively large dimensions and high weight, the handling of the unit is only to be done by means of lifting tools with slings. These slings can be fitted into specialy for this purpose foreseen sleeves at the base frame.



⚠

- To avoid injury, do not touch the air inlet or aluminium fins of the unit.
- Do not use the grips in the fan grills to avoid damage.

IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type: R410A
GWP[(1)] value: 1975

[(1)] GWP = global warming potential

The refrigerant quantity is indicated on the unit name plate

SELECTING INSTALLATION SITE

- Make sure to provide for adequate measures in order to prevent that the outdoor unit be used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.

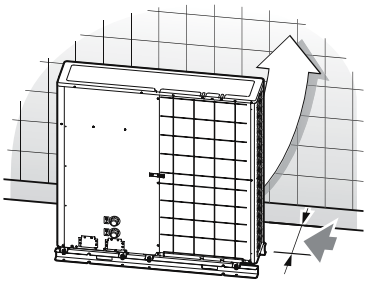
1 Select an installation site where the following conditions are satisfied and that meets with your customer's approval.
- Places which are well-ventilated.
- Places where the unit does not bother next-door neighbours.
- Safe places which can withstand the unit's weight and vibration and where the unit can be installed level.
- Places where there is no possibility of flammable gas or product leak.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Places where servicing space can be well ensured.
- Places where the units' piping and wiring lengths come within the allowable ranges.
- Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
- Places where the rain can be avoided as much as possible.

2 When installing the unit in a place exposed to strong wind, pay special attention to the following.

Strong winds of 5 m/sec or more blowing against the unit's air outlet causes short circuit (suction of discharge air), and this may have the following consequences:
- Deterioration of the operational capacity.
- Frequent frost acceleration in heating operation.
- Disruption of operation due to rise of high pressure.
- When a strong wind blows continuously on the face of the unit, the fan can start rotating very fast until it breaks.

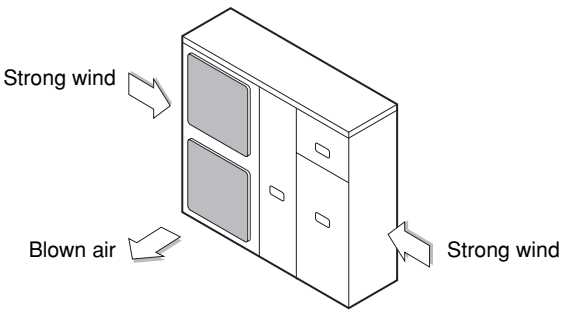
Refer to the figures for installation of this unit in a place where the wind direction can be foreseen.

- Turn the air outlet side toward the building's wall, fence or screen.



Make sure there is enough room to do the installation

- Set the outlet side at a right angle to the direction of the wind.



3 Prepare a water drainage channel around the foundation, to drain waste water from around the unit.

4 If the water drainage of the unit is not easy, please build up the unit on a foundation of concrete blocks, etc. (the height of the foundation should be maximum 150 mm).

5 If you install the unit on a frame, please install a waterproof plate within 150 mm of the underside of the unit in order to prevent the invasion of water from the lower direction.

6 When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.

7 If you install the unit on a building frame, please install a waterproof plate (field supply)(within 150 mm of the underside of the unit) or use a drain kit (refer to combination table in "Possible options" on page 3) in order to avoid the drainwater dripping. (See figure).

Selecting a location in cold climates

Refer to "Model" on page 3.

CAUTION

When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

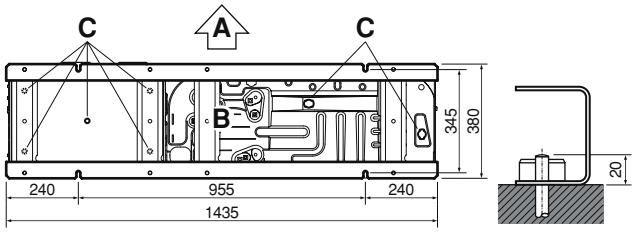
- To prevent exposure to wind, install the unit with its suction side facing the wall.
- Never install the unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the unit.
- In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).

1 Construct a large canopy.

2 Construct a pedestal.
Install the unit high enough off the ground to prevent burying in snow.

PRECAUTIONS ON INSTALLATION

- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts. (Prepare four sets of M12 foundation bolts, nuts and washers each which are available on the market.)
- It is best to screw in the foundation bolts until their length are 20 mm from the foundation surface.



A Discharge side

B Bottom view (mm)

C Drain hole

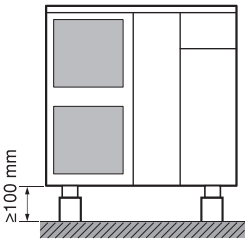
Drain work

Check in the combination table under "Possible options" on page 3 whether drain work is allowed. In case drain work on your unit is allowed and the installation site requires drain work, then follow the guidelines below.

- Drain kits for drainage are available as option.
- If drain work from the unit causes trouble (for example, if the drain water may splash on people) provide the drain piping using a drain socket (optional).
- Make sure the drain works properly.

NOTE

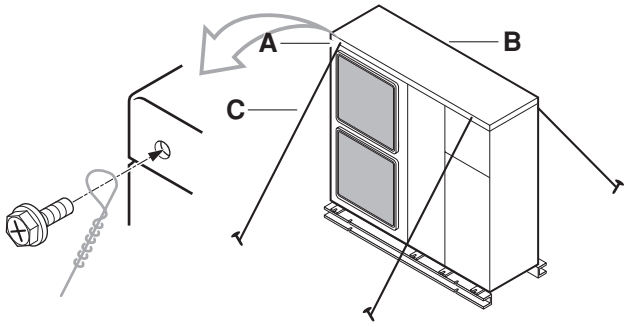
If drain holes of the unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 100 mm under the unit.



Installation method for prevention of falling over

If it is necessary to prevent the unit from falling over, install as shown in the figure.

- prepare all 4 wires as indicated in the drawing
- unscrew the top plate at the 4 locations indicated A and B
- put the screws through the nooses and screw them back tight



A	Location of the 2 fixation holes on the front side of the unit
B	Location of the 2 fixation holes on the rear side of the unit
C	Wires: field supply

Installation servicing space

The numerical figures used in the figures represent the dimensions in mm.

(Refer to "Precautions on installation" on page 4)

Precaution

(A) In case of non-stacked installation (See figure 1)

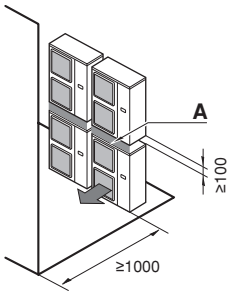
	Suction side obstacle	✓	Obstacle is present
	Discharge side obstacle	**1**	In these cases, close the bottom of the installation frame to prevent the discharged air from being bypassed
	Left side obstacle		
	Right side obstacle	**2**	In these cases, only 2 units can be installed.
	Top side obstacle		This situation is not allowed

NOTE

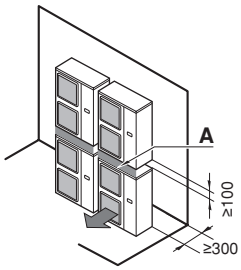
Minimum distance B1 in figure 1 mentions the space required for correct operation of the unit. Required space for servicing though is 300 mm.

(B) In case of stacked installation

1. In case obstacles exist in front of the outlet side.



2. In case obstacles exist in front of the air inlet.

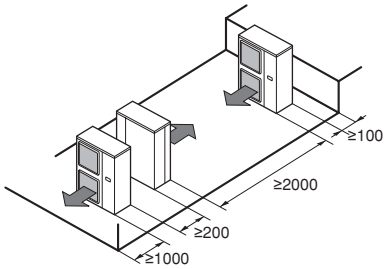


Do not stack more than one unit.

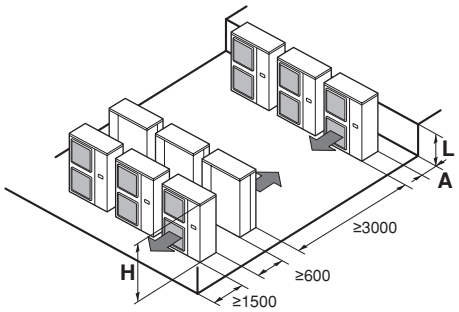
About 100 mm is required as the dimension for laying the upper unit's drain pipe. Get the portion A sealed so that air from the outlet does not bypass.

(C) In case of multiple-row installation (for roof top use, etc.)

1. In case of installing one unit per row.



2. In case of installing multiple units (2 units or more) in lateral connection per row.



Relation of dimensions of H, A and L are shown in the table below.

	L	A
L≤H	0<L≤1/2H	250
	1/2H<L	300
H<L	Installation not allowed	

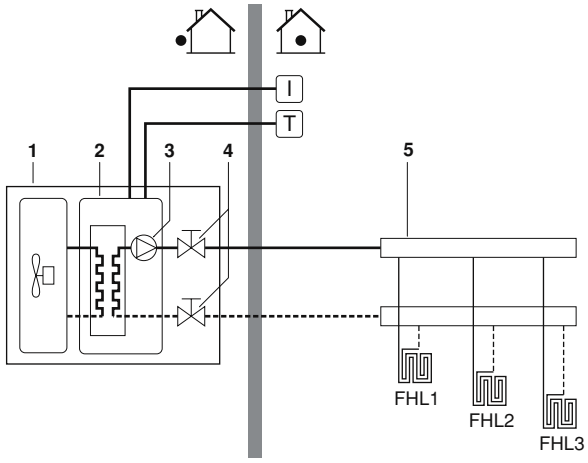
TYPICAL APPLICATION EXAMPLES

When the altherma by DAIKIN system is used in series with another heat source (e.g. gas boiler), it shall be made sure that the return water temperature to the heat exchanger does not exceed 55°C. Daikin shall not be held liable for any damage resulting from not observing this rule.

The application examples given below are for illustration purposes only.

Application 1

Space heating only application with a room thermostat connected to the unit.



1	Unit	**FHL1..3**	Floor heating loop (field supply)
2	Heat exchanger		
3	Pump	**T**	Room thermostat (field supply)
4	Shut-off valve		
5	Collector (field supply)	**I**	User interface

Unit operation and space heating

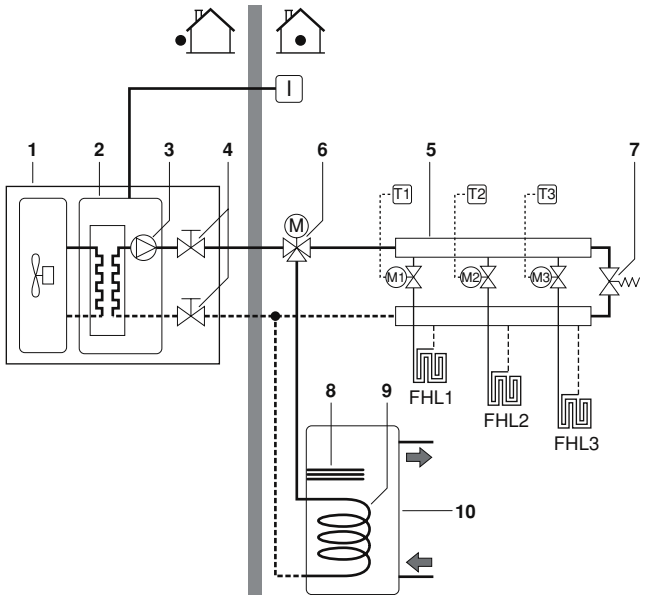
When a room thermostat (T) is connected to the unit and when there is a heating request from the room thermostat, the unit will start operating to achieve the target leaving water temperature as set on the user interface.

When the room temperature is above the thermostat set point, the unit will stop operating.

Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 16) and to configure the DIP switch toggle switches correctly (see "Room thermostat installation configuration" on page 19).

Application 2

Space heating only application without room thermostat connected to the unit. The temperature in each room is controlled by a valve on each water circuit. Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



1	Unit	**9**	Heat exchanger coil
2	Heat exchanger	**10**	Domestic hot water tank
3	Pump	**FHL1..3**	Floor heating loop (field supply)
4	Shut-off valve		
5	Collector (field supply)	**T1..3**	Individual room thermostat (field supply)
6	Motorised 3-way valve		
7	By-pass valve (field supply)	**M1..3**	Individual motorised valve to control loop FHL1 (field supply)
8	Booster heater	**I**	User interface

Pump operation

With no thermostat connected to the unit (1), the pump (3) can be configured to operate either as long as the unit is on, or until the required water temperature is reached.

NOTE Details on pump configuration can be found under "Pump operation configuration" on page 19.

Space heating

The unit (1) will operate to achieve the target leaving water temperature as set on the user interface.

When circulation in each space heating loop (FHL1..3) is controlled by remotely controlled valves (M1..3), it is important to provide a by-pass valve (7) to avoid the flow switch safety device from being activated.

The by-pass valve should be selected as such that at all time the minimum water flow as mentioned under "Water pipework" on page 10 is guaranteed.

Domestic water heating

When domestic water heating mode is enabled (either manually by the user, or automatically through a schedule timer) the target domestic hot water temperature will be achieved by a combination of the heat exchanger coil and the electrical booster heater.

When the domestic hot water temperature is below the user configured set point, the 3-way valve will be activated to heat the domestic water by means of the heat pump. In case of large domestic hot water demand or a high domestic hot water temperature setting, the booster heater (8) can provide auxiliary heating.

It is possible to connect either a 2-wire or a 3-wire 3-way valve (6). Make sure to fit the 3-way valve correctly. For more details, refer to "Wiring the 3-way valve" on page 17.

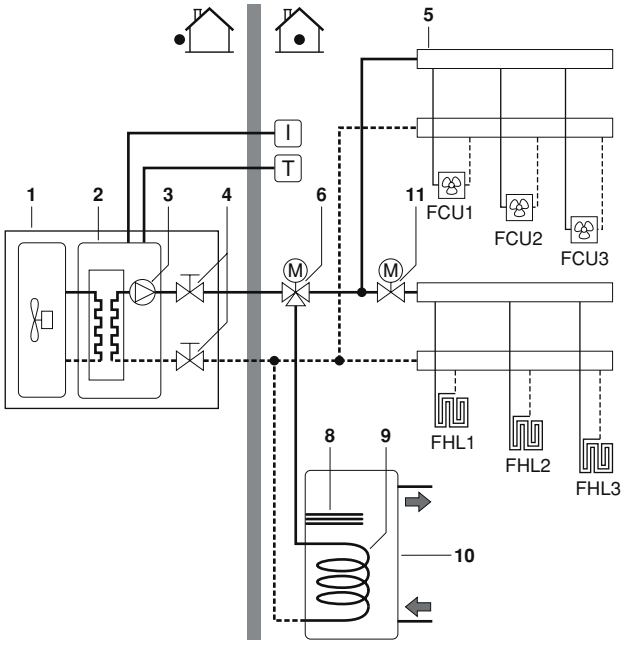
NOTE

The unit can be configured so that at low outdoor temperatures the domestic water is exclusively heated by the booster heater. This assures that the full capacity of the heat pump is available for space heating.

Details on domestic hot water tank configuration for low outdoor temperatures can be found under "Field settings" on page 21, field settings [5-02] to [5-04].

Application 3

*Space cooling and heating application with a **room thermostat suitable for cooling/heating changeover** connected to the unit. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only.*
Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



1	Unit	**10**	Domestic hot water tank
2	Heat exchanger	**11**	Motorised 2-way valve (field supply)
3	Pump		
4	Shut-off valve	**FCU1..3**	Fan coil unit (field supply)
5	Collector (field supply)	**FHL1..3**	Floor heating loop (field supply)
6	Motorised 3-way valve	**T**	Room thermostat with cooling/heating switch (field supply)
8	Booster heater		
9	Heat exchanger coil	**I**	User interface

Pump operation and space heating and cooling

According to the season, the customer will select cooling or heating on the room thermostat (T). This selection is not possible by operating the user interface.

When space cooling/heating is requested by the room thermostat (T), the pump will start operating and the unit (1) will switch to "cooling mode"/"heating mode". The unit (1) will start operating to achieve the target leaving cold/hot water temperature.

In case of cooling mode, the motorised 2-way valve (11) will close as to prevent cold water running through the floor heating loops (FHL).

Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 16) and to configure the DIP switch toggle switches correctly (see "Room thermostat installation configuration" on page 19).

Wiring of the 2-way valve (11) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

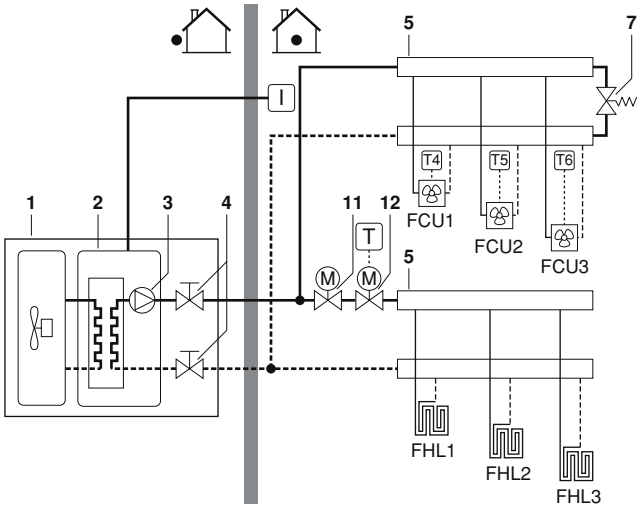
The ON/OFF setting of the heating/cooling operation is done by the room thermostat and cannot be done by the user interface.

Domestic water heating

Domestic water heating is as described under "Application 2" on page 6.

Application 4

*Space cooling and heating application **without a room thermostat connected to the unit**, but with a heating only room thermostat controlling the floor heating and a cooling/heating thermostat controlling the fan coil units. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only.*



1	Unit	**12**	Motorised 2-way valve for activation of the room thermostat (field supply)
2	Heat exchanger		
3	Pump	**FCU1..3**	Fan coil unit with thermostat (field supply)
4	Shut-off valve		
5	Collector (field supply)	**FHL1..3**	Floor heating loop (field supply)
7	By-pass valve (field supply)	**T**	Heating only room thermostat (field supply)
11	Motorised 2-way valve to shut off the floor heating loops during cooling operation (field supply)	**T4..6**	Individual room thermostat for fan coil heated/cooled room (field supply)
		I	User interface

Pump operation

With no thermostat connected to the unit (1), the pump (3) can be configured to operate either as long as the unit is on, or until the required water temperature is reached.

NOTE Details on pump configuration can be found under "Pump operation configuration" on page 19.

Space heating and cooling

According to the season, the customer will select cooling or heating through the user interface.

The unit (1) will operate in cooling mode or heating mode to achieve the target leaving water temperature.

With the unit in heating mode, the 2-way valve (11) is open. Hot water is provided to both the fan coil units and the floor heating loops.

With the unit in cooling mode, the motorised 2-way valve (11) is closed to prevent cold water running through the floor heating loops (FHL).

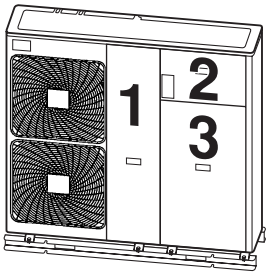
⚠ When closing several loops in the system by remotely controlled valves, it might be required to install a by-pass valve (7) to avoid the flow switch safety device from being activated. See also "Application 2" on page 6.

⚠ Wiring of the 2-way valve (11) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

The ON/OFF setting of the heating/cooling operation is done by the user interface.

OVERVIEW OF THE UNIT

Opening the unit



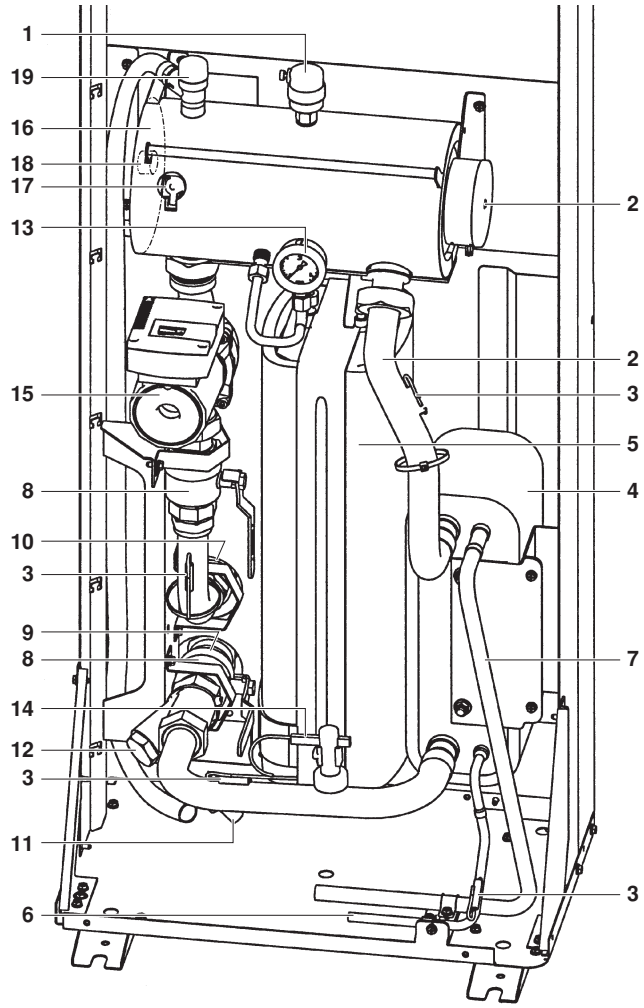
Door 1	gives acces to the compressor compartment and electrical parts
Door 2	gives acces to the electrical parts of the hydraulic compartment
Door 3	gives acces to the hydraulic compartment

⚠ Switch off all power supply — i.e. unit power supply and backup heater and domestic hot water tank power supply (if applicable) — before removing doors 1 and 2.

⚠ Parts inside the unit can be hot.

Main components

Hydraulic compartment (door 3)



1. Air purge valve
   Remaining air in the water circuit will be automatically removed via the air purge valve.
2. Backup heater
   The backup heater consists of an electrical heating element that will provide additional heating capacity to the water circuit if the heating capacity of the unit is insufficient due to low outdoor temperatures, it also protects the external water piping from freezing during cold periodes.
3. Temperature sensors
   Four temperature sensors determine the water and refrigerant temperature at various points in the water circuit.
4. Heat exchanger
5. Expansion vessel (10 l)
6. Refrigerant liquid connection
7. Refrigerant gas connection
8. Shut-off valves
   The shut-off valves on the water inlet connection and water outlet connection allow isolation of the unit water circuit side from the residential water circuit side. This facilitates draining and filter replacement of the unit.
9. Water inlet connection
10. Water outlet connection
11. Drain and fill valve
12. Water filter
    The water filter removes dirt from the water to prevent damage to the pump or blockage of the evaporator. The water filter must be cleaned on a regular base. See "Maintenance" on page 29.

13. Manometer
The manometer allows readout of the water pressure in the water circuit.

14. Flow switch
The flow switch checks the flow in the water circuit and protects the heat exchanger against freezing and the pump against damage.

15. Pump
The pump circulates the water in the water circuit.

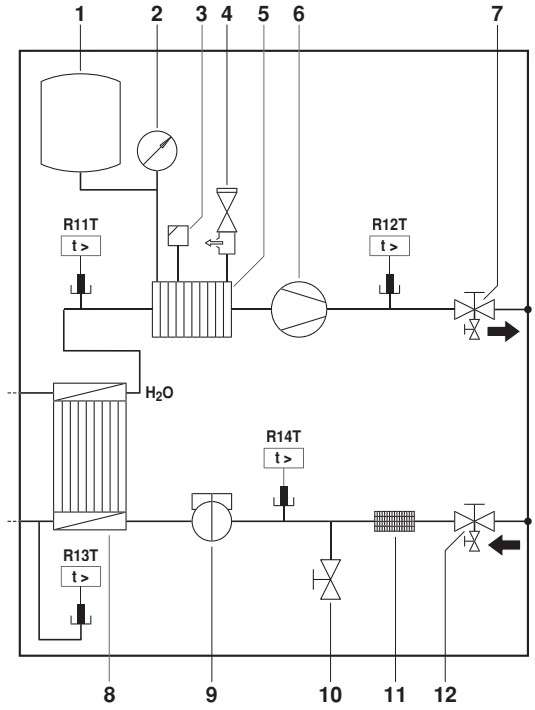
16. Backup heater vessel
The backup heater heats the water in the backup heater vessel.

17. Backup heater thermal protector
The backup heater is equipped with a thermal protector. The thermal protector is activated when the temperature becomes too high.

18. Backup heater thermal fuse
The backup heater is equipped with a thermal fuse. The thermal fuse is blown when the temperature becomes too high (higher than the backup heater thermal protector temperature).

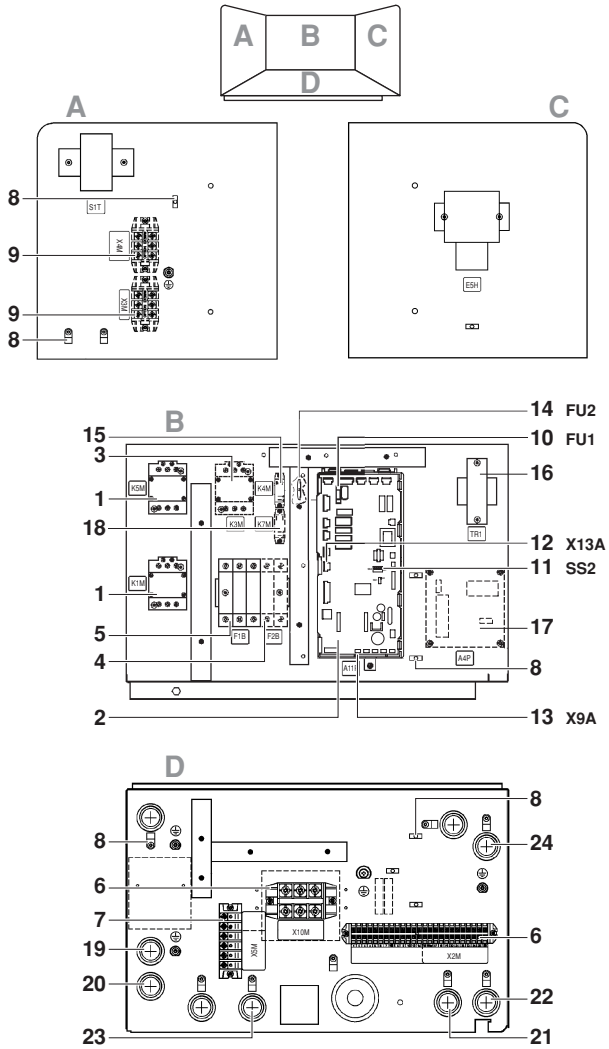
19. Pressure relief valve
The pressure relief valve prevents excessive water pressure in the water circuit by opening at 3 bar and discharging some water.

Functional diagram of hydraulic compartment (door 3)



1	Expansion vessel	**8**	Heat exchanger
2	Manometer	**9**	Flow switch
3	Air purge valve	**10**	Drain/fill valve
4	Pressure relief valve	**11**	Filter
5	Backup heater vessel with backup heater	**12**	Shut-off valve water inlet with drain valve
6	Pump	**R11T**	Temperature sensors
7	Shut-off valve water outlet	**R12T** **R13T** **R14T**	

Switch box main components (door 2)



1. Backup heater contactors K1M and K5M

2. Main PCB
The main PCB (Printed Circuit Board) controls the functioning of the unit.

3. Booster heater contactor K3M (only for installations with domestic hot water tank)

4. Booster heater circuit breaker F2B (only for installations with domestic hot water tank)
The circuit breaker protects the booster heater in the domestic hot water tank against overload or short circuit.

5. Backup heater circuit breaker F1B
The circuit breaker protects the backup heater electrical circuit against overload or short circuit.

6. Terminal blocks
The terminal blocks allow easy connection of field wiring.

7. Terminal block for backup heater capacity limitation.

8. Cable tie mountings
The cable tie mountings allow to fix the field wiring with cable ties to the switch box to ensure strain relief.

9. Terminal blocks X3M, X4M (only for installations with domestic hot water tank)

10. PCB fuse FU1

11. DIP switch SS2
The DIP switch SS2 provides 4 toggle switches to configure certain installation parameters. See "DIP switch settings overview" on page 19.

12. X13A socket
The X13A socket receives the K3M connector (only for installations with domestic hot water tank).

13. X9A socket
    The X9A socket receives the thermistor connector (only for installations with domestic hot water tank).
14. Pump fuse FU2 (in line fuse)
15. Pump relay K4M
16. Transformer TR1
17. A4P Solar/remote alarm input/output PCB (only for installations with solar kit or remote alarm kit)
18. K7M relay for solar pump (optional)
    This relay and its output on X2M can be activated when the solar input on A4P becomes active.
19. Conduit hole to pass through the booster heater power supply cable.
20. Conduit hole to pass through the booster heater power supply cable and the thermal protection cabel.
21. Conduit hole to pass through the room thermostat cable and 2-way valve and 3-way valve control cables.
22. Conduit hole to pass through the thermistor cable and user interface cable (and benefit kWh rate cable).
23. Conduit hole to pass through the backup heater power supply wiring.
24. Conduit hole to pass through optional input/output PCB connection wiring.

NOTE The electrical wiring diagram can be found on the inside of the switch box cover.

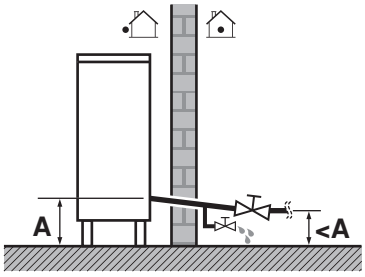
Water pipework

All piping lengths and distances have been taken into consideration.

Requirement	Value
Maximum allowable distance between the 3-way valve and the unit (only for installations with domestic hot water tank).	3 m
Maximum allowable distance between the domestic hot water tank and the unit (only for installations with domestic hot water tank). The thermistor cable supplied with the domestic hot water tank is 12 m in length.	10 m

NOTE If the installation is equipped with a domestic hot water tank (optional), please refer to the domestic hot water tank installation manual.

In case of a power supply failure or pump operating failure, drain the system (as suggested in the figure below).



When water is at standstill inside the system, freezing up is very likely to happen and damaging the system in the proces.

Checking the water circuit

The units are equipped with a water inlet and water outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with all relevant European and national regulations.

The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.

Before continuing the installation of the unit, check the following points:

- The maximum water pressure is 3 bar.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance.
  A drain valve is provided in the unit to drain the water from the unit water system.
- Air vents must be provided at all high points of the system. The vents should be located at points which are easily accessible for servicing. An automatic air purge is provided inside the unit. Check that this air purge valve is not tightened too much so that automatic release of air in the water circuit remains possible.
- Take care that the components installed in the field piping can withstand the water pressure.

Checking the water volume and expansion vessel pre-pressure

The unit is equipped with an expansion vessel of 10 litre which has a default pre-pressure of 1 bar.

To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted and the minimum and maximum water volume must be checked.

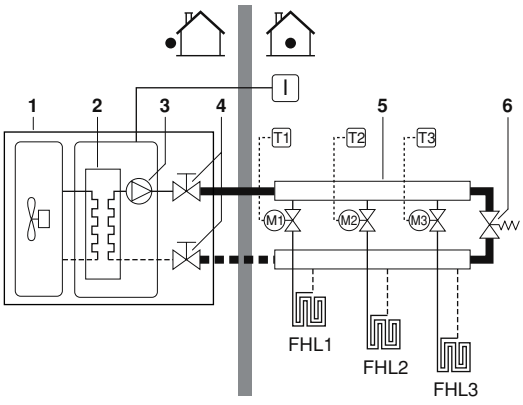
1 Check that the total water volume in the installation, excluding the internal water volume of the unit, is 20 l minimum. Refer to "Technical specifications" on page 33 to know the internal water volume of the unit.

In most applications this minimum water volume will have a satisfying result.

In critical processes or in rooms with a high heat load though, extra water volume might be required.

When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume is kept even if all the valves are closed.

Example



1	Unit	**FHL1..3**	Floor heating loop (field supply)
2	Heat exchanger	**T1..3**	Individual room thermostat (field supply)
3	Pump	**M1..3**	Individual motorised valve to control loop FHL1 (field supply)
4	Shut-off valve	**I**	User interface
5	Collector (field supply)		
6	By-pass valve (field supply)		

2 Using the table below, determine if the expansion vessel pre-pressure requires adjustment.

3 Using the table and instructions below, determine if the total water volume in the installation is below the maximum allowed water volume.

Installation height difference[(a)]	Water volume	
	≤280 l	>280 l
≤7 m	No pre-pressure adjustment required.	Actions required: • pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel" • check if the water volume is lower than maximum allowed water volume (use graph below)
>7 m	Actions required: • pre-pressure must be increased, calculate according to "Calculating the pre-pressure of the expansion vessel" • check if the water volume is lower than maximum allowed water volume (use graph below)	Expansion vessel of the unit too small for the installation.

(a) Installation height difference: height difference (m) between the highest point of the water circuit and the unit. If the unit is located at the highest point of the installation, the installation height is considered 0 m.

Calculating the pre-pressure of the expansion vessel

The pre-pressure (Pg) to be set depends on the maximum installation height difference (H) and is calculated as below:

Pg=(H/10+0.3) bar

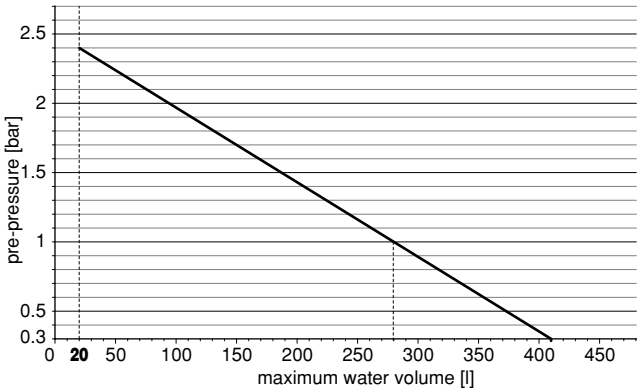
Checking the maximum allowed water volume

To determine the maximum allowed water volume in the entire circuit, proceed as follows:

1 Determine for the calculated pre-pressure (Pg) the corresponding maximum water volume using the graph below.

2 Check that the total water volume in the entire water circuit is lower than this value.

If this is not the case, the expansion vessel inside the unit is too small for the installation.



pre-pressure = pre-pressure

maximum water volume = maximum water volume

Example 1

The unit is installed 5 m below the highest point in the water circuit. The total water volume in the water circuit is 100 l.

In this example, no action or adjustment is required.

Example 2

The unit is installed at the highest point in the water circuit. The total water volume in the water circuit is 350 l.

Result:

- Since 350 l is higher than 280 l, the pre-pressure must be decreased (see table above).
- The required pre-pressure is:
  Pg = (H/10 + 0.3) bar = (0/10 + 0.3) bar = 0.3 bar
- The corresponding maximum water volume can be read from the graph: approximately 410 l.
- Since the total water volume (350 l) is below the maximum water volume (410 l), the expansion vessel suffices for the installation.

Setting the pre-pressure of the expansion vessel

When it is required to change the default pre-pressure of the expansion vessel (1 bar), keep in mind the following guidelines:

- Use only dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system. Therefore, the pre-pressure should only be adjusted by a licensed installer.

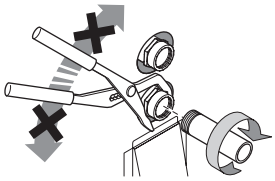
Connecting the water circuit

Water connections must be made in accordance with the outlook diagram delivered with the unit, respecting the water in- and outlet.

Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- Use a good thread sealant for the sealing of the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-brass metallic piping, make sure to insulate both materials from each other to prevent galvanic corrosion.
- Because brass is a soft material, use appropriate tooling for connecting the water circuit. Inappropriate tooling will cause damage to the pipes.



- The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.
- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.

NOTE

- When using a 3-way valve in the water circuit.
  Preferably choose a ball type 3-way valve to guarantee full separation between domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit.
  The recommended maximum changeover time of the valve should be less than 60 seconds.

Protecting the water circuit against freezing

Frost can damage the unit. For this reason, in colder climates the water circuit can be protected by means of adding glycol to the water. However, this unit is by default already foreseen with a freeze-up protection function. Refer to paragraph "[4-04] Freeze-up protection function" on page 23.

Depending on the expected lowest outdoor temperature, make sure the water system is filled with a weight concentration of glycol as mentioned in the table below.

Minimum outdoor temperature	Ethylene glycol[(a)]	Propylene glycol
–5°C	10%	15%
–10°C	25%	25%
–15°C	35%	35%
–25°C	45%	45%

WARNING

[(a)] Use of ethylene glycol is not allowed for installations with a domestic hot water tank.

Corrosion of the system due to presence of glycol

Uninhibited glycol will turn acidic under the influence of oxygen. This process is accelerated by presence of copper and at higher temperatures. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.

It is therefore of extreme importance:

- that the water treatment is correctly executed by a qualified water specialist;
- that a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols;
- that in case of an installation with a domestic hot water tank, only the use of propylene glycol is allowed. In other installations the use of ethylene glycol is permitted as well;
- that no automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates which can foul or plug the system;
- that galvanized piping is not used in glycol systems since its presence may lead to the precipitation of certain components in the glycol's corrosion inhibitor;
- that it has to be made sure the glycol is compatible with the used materials in the system.

NOTE

Be aware of the hygroscopic property of glycol: it absorbs moisture from its environment.

Leaving the cap off the glycol container causes the concentration of water to increase. The glycol concentration is then lower than assumed. And in consequence, freezing can happen after all.

Preventive actions must be taken to ensure minimal exposure of the glycol to air.

Also refer to "Checks before initial start-up" on page 20.

Charging water

1 Connect the water supply to a drain and fill valve (see "Main components" on page 8).

2 Make sure the automatic air purge valve is open (at least 2 turns).

3 Fill with water until the manometer indicates a pressure of approximately 2.0 bar. Remove air in the circuit as much as possible using the air purge valves. Air present in the water circuit might cause malfunctioning of the backup heater.

4 Check that the backup heater vessel is filled with water by opening the pressure relief valve. Water must flow out of the valve.

NOTE

- During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic air purge valves during first operating hours of the system. Additional filling with water afterwards might be required.
- The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature).

  However, at all times water pressure should remain above 0.3 bar to avoid air entering the circuit.
- The unit might dispose some excessive water through the pressure relief valve.
- Water quality must be according to EN directive 98/83 EC.

Piping insulation

The complete water circuit, inclusive all piping, must be insulated to prevent condensation during cooling operation and reduction of the cooling and heating capacity as well as prevention of freezing of the outside water piping during winter time. The thickness of the sealing materials must be at least 13 mm with $\lambda = 0.036$ W/mK in order to prevent freezing on the outside water piping.

If the temperature is higher than 30°C and the humidity is higher than RH 80%, then the thickness of the sealing materials should be at least 20 mm in order to avoid condensation on the surface of the sealing.

Field wiring

WARNING

- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local and national legislation.
- Switch off the power supply before making any connections.
- All field wiring and components must be installed by a licensed electrician and must comply with relevant European and national regulations.
- The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.
- Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.
- Be sure to establish an earth. Do not earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Be sure to install an earth leakage protector (30 mA). Failure to do so may cause electrical shock.

Precautions on electrical wiring work

High voltage

To avoid electrical shock, make sure to disconnect the power supply 1 minute or more before servicing the electrical parts. Even after 1 minute, always measure the voltage at the terminals of main circuit capacitors or electrical parts and, before touching, make sure that those voltages are 50 V DC or less.

- Use only copper wires.
- For W1

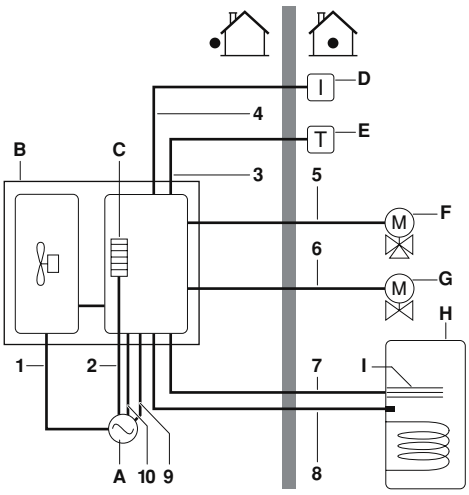
  Make sure to connect power supply cables in normal phase. If connected in reverse phase, the remote controller indicates *"U1"* and the equipment cannot operate. Change any two of the three power supply cables (L1, L2, L3) to correct phase.
- Never squeeze bundled cables into a unit.
- Fix cables so that cables do not make contact with the pipes (especially on high pressure side).
- Secure the electrical wiring with cable ties as shown in figure 2 so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the earth leakage circuit breaker make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the earth leakage circuit breaker.

NOTE The earth leakage circuit breaker must be a high-speed type breaker of 30 mA (<0.1 s).

- As this unit is equipped with an inverter, installing a phase advancing capacitor not only will deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves. Therefore, never install a phase advancing capacitor.

Overview

The illustration below gives an overview of the required field wiring between several parts of the installation. Refer also to "Typical application examples" on page 6.



A	Single power supply for unit, backup heater and booster heater	**F**	3-way valve for domestic hot water tank (field supply, optional)
B	Unit	**G**	2-way valve for cooling mode (field supply, optional)
C	Backup heater	**H**	Domestic hot water tank (optional)
D	User interface	**I**	Booster heater (optional)
E	Room thermostat (field supply, optional)		

Item	Description	AC/ DC	Required number of conductors	Maximum running current
1	Power supply cable for unit	AC	2+GND (V3) 4+GND (W1)	(a)
2	Power supply cable for backup heater	AC	2+GND (V3) 3+GND (W1)	(b)
3	Room thermostat cable	AC	3 or 4	100 mA(c)
4	User interface cable	DC	2	100 mA(c)
5	3-way valve control cable	AC	2+GND	100 mA(c)
6	2-way valve control cable	AC	2+GND	100 mA(c)
7	Booster heater power supply and thermal protection cable	AC	4+GND	(b)
8	Thermistor cable	DC	2	(d)
9	Booster heater power supply cable	AC	2+GND	13 A
10	Benefit kWh rate power supply cable (voltage free contact)	DC	2	100 mA(c)

(a) Refer to nameplate on outdoor unit
(b) See table under "Connection of the backup heater power supply" on page 15.
(c) Minimum cable section 0.75 mm^2
(d) The thermistor and connection wire (12 m) are delivered with the domestic hot water tank.

Internal wiring - Parts table

Refer to the internal wiring diagram supplied with the unit (on the inside of the switch box cover). The abbreviations used are listed below.

Door 1 compressor compartment and electrical parts

V3 models only

A1P ..... Main PCB
A2P ..... Inverter PCB
A3P ..... Noise filter PCB
A4P ..... PCB
BS1~BS4 ..... Push button switch
C1~C4 ..... Capacitor
DS1 ..... DIP switch
E1H ..... Bottom plate heater
E1HC ..... Crankcase heater
F1U,F3U,F4U .. Fuse (T 6.3 A/250 V)
F6U ..... Fuse (T 5.0 A/250 V)
F7U,F8U ..... Fuse (F 1.0 A/250 V)
H1P~H7P ..... Orange LED service monitor (A2P)
H2P: prepare, test = flickering
H2P: malfunction detection = light up
HAP (A1P) ..... Green LED service monitor
K1R ..... Magnetic relay (Y1S)
K4R ..... Magnetic relay (E1HC)
K10R,K11R ..... Magnetic relay
L1R ..... Reactor
M1C ..... Motor (compressor)
M1F ..... Motor (upper fan)
M2F ..... Motor (lower fan)
PS ..... Switching power supply
Q1DI ..... Field earth leakage protector (300 mA)
R1,R2 ..... Resistor
R1T ..... Thermistor (air)
R2T ..... Thermistor (discharge)
R3T ..... Thermistor (suction)
R4T ..... Thermistor (heat exchanger)
R5T ..... Thermistor (heat exchanger middle)
R6T ..... Thermistor (liquid)
R10T ..... Thermistor (fin)
RC ..... Signal receiver circuit
S1NPH ..... Pressure sensor
S1PH ..... High pressure switch

TC.....Signal transmission circuit
V1R.....Power module
V2R,V3R.....Diode module
V1T.....IGBT
X1M.....Power supply terminal strip
X1Y.....Optional connector
Y1E.....Electronic expansion valve
Y1S.....Solenoid valve (4 way valve)
Z1C~Z3C.....Noise filter (ferrite core)
Z1F~Z4F.....Noise filter

W1 models only

A1P.....Main PCB
A2P.....Inverter PCB
A3P.....Noise filter PCB
BS1~BS4.....Push button switch
C1~C4.....Capacitor
DS1.....DIP switch
E1H.....Bottom plate heater
E1HC.....Crankcase heater
F1U,F2U.....Fuse (31.5 A/500 V)
F3U~F6U.....Fuse (T 6.3 A/500 V)
F7U.....Fuse (T 5.0 A/250 V)
F8U,F9U.....Fuse (F 1.0 A/250 V)
H1P~H7P.....Orange LED service monitor (A1P)
HAP (A1P).....Green LED service monitor
HAP (A2P).....Green LED service monitor
K1M,K2M.....Magnetic contactor
K1R (A1P).....Magnetic relay (Y1S)
K1R (A2P).....Magnetic relay
K2R (A1P).....Magnetic relay (Y2S)
K3R (A1P).....Magnetic relay (E1HC)
L1R~L3R.....Reactor
L4R.....Reactor for fan motor
M1C.....Motor (compressor)
M1F.....Motor (upper fan)
M2F.....Motor (lower fan)
PS.....Switching power supply
Q1DI.....Earth leakage protector
R1~R4.....Resistor
R1T.....Thermistor (air)
R2T.....Thermistor (discharge)
R3T.....Thermistor (suction)
R4T.....Thermistor (heat exchanger)
R5T.....Thermistor (heat exchanger middle)
R6T.....Thermistor (liquid)
R7T.....Thermistor (fin)
S1NPH.....Pressure sensor
S1PH.....High pressure switch
V1R,V2R.....Power module
V3R.....Diode module
X1M.....Terminal strip
X6A,X77A,X1Y...Optional connectors
Y1E.....Electronic expansion valve
Y1S.....Solenoid valve (4 way valve)
Y3S.....Solenoid valve
Z1C~Z9C.....Noise filter (ferrite core)
Z1F~Z4F.....Noise filter

Door 2 electrical parts of the hydraulic compartment

A11P.....Main PCB
A12P.....User interface PCB (remote controller)
A3P.....Thermostat (EKRTW)(PC=Power Circuit)
A4P.....Solar/remote alarm PCB (EKRP1H)
A4P.....Receiver PCB (EKRTR)
E11H,E12H.....Backup heater element 1, 2 (6 kW)
E13H.....Backup heater element 3 (6 kW)(for W1 models only)
E4H.....Booster heater (3 kW)
E5H.....Switch box heater
E6H.....Expansion vessel heater
E7H.....Plate heat exchanger heater
F1B.....Fuse backup heater
F1T.....Thermal fuse backup heater
F2B.....Fuse booster heater
F10U~F13U.....Fuse 1.0 A F 250 V
FU1.....Fuse 3.15 A T 250 V for PCB
FU2.....Fuse 5 A T 250 V
FuR,FuS.....Fuse 5 A 250 V for solar/remote alarm PCB
K1M.....Contactor backup heater step
K3M.....Contactor booster heater
K4M.....Pump relay
K5M.....Contactor for backup heater all pole disconnection
K7M.....Relay for solar pump
M1P.....Pump
M2S.....2-way valve for cooling mode
M3S.....3-way valve: floor heating/domestic hot water
PHC1.....Optocoupler input circuit
Q1DI.....Earth leakage protector
Q1L.....Thermal protector backup heater
Q2L.....Thermal protector 1/2 booster heater
Q3L.....Thermal protector 1/2 booster heater (for W1 models only)
R1H.....Humidity sensor (EKRTR)
R1T.....Ambient sensor (EKRTW/EKRTR)
R2T.....External sensor for floor heating or ambient temperature (EKRTETS)
R11T.....Outlet water heat exchanger thermistor
R12T.....Outlet water backup heater thermistor
R13T.....Refrigerant liquid side thermistor
R14T.....Inlet water thermistor
R5T.....Domestic hot water thermistor (EKHW*)
S1L.....Flow switch
S1S.....Solar pumpstation relay
S1T.....Thermostat switch box heater
S2S.....Benefit kWh rate power supply contact
S2T.....Thermostat expansion vessel heater
S3T.....Thermostat plate heat exchanger
SS1.....DIP switch
TR1.....Transformer 24 V for PCB
V1S,V2S.....Spark suppression 1, 2
X1M-X10M.....Terminal strips
X2Y.....Connector

Field wiring guidelines

- Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the switch box service panel (door 2).
- Cable tie mountings are provided at the bottom of the switch box. Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (optional), require a dedicated power circuit for the **booster heater**.

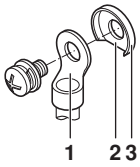
  Please refer to the domestic hot water tank installation manual.

Secure the wiring in the order shown below.

- Lay the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely (see figure 2).
- Follow the electric wiring diagram for electrical wiring works (the electric wiring diagrams are located on the rear side of doors 1 and 2).
- Form the wires and fix the cover firmly so that the cover may be fit in properly.

Precautions on wiring of power supply

- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instruction.



1 Round pressure terminal
2 Cut out section
3 Cup washer

  - Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.)
  - When connecting wires of the same gauge, connect them according to the below figure.

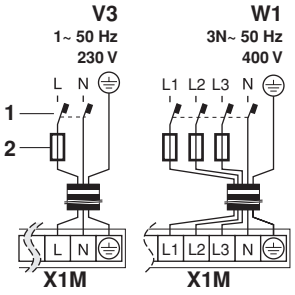
- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- See the table below for tightening torques for the terminal screws.

Tightening torque (N·m)	
M4 (X1M)	1.2~1.8
M5 (X1M)	2.0~3.0
M5 (EARTH)	3.0~4.0

- Attach an earth leakage circuit breaker and fuse to the power supply line.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside forces are not applied to the terminals.

Specifications of standard wiring components

Door 1: compressor compartment and electrical parts: **X1M**



1 Earth leakage circuit breaker
2 Fuse

	V3	W1
Minimum circuit amps (MCA)[a]	28.2	13.5
Recommended field fuse	32 A	20 A
Wire type[b]	H05VV-U3G	H05VV-U5G
Size	Wiring size must comply with the applicable local and national code	
Wire type of wiring between the units	H05VV-U4G2.5	

(a) Stated values are maximum values (see electrical data of combination with indoor unit for exact values).
(b) Only in protected pipes, use H07RN-F when protected pipes are not used.

NOTE The earth leakage circuit breaker must be a high-speed type breaker of 30 mA (<0.1 s).

For V3 model: Equipment complying with EN/IEC 61000-3-12 (European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase.)

The wiring diagram can be found on the inside of the front plate of the unit.

Connection of the backup heater power supply

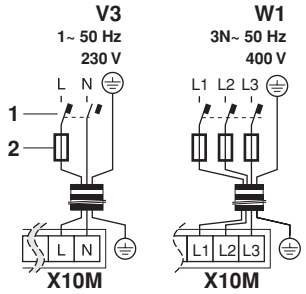
Power circuit and cable requirements

- Be sure to use a dedicated power circuit for the backup heater. Never use a power circuit shared by another appliance.
- Use one and same dedicated power supply for the unit, backup heater and booster heater (domestic hot water tank).

This power circuit must be protected with the required safety devices according to local and national regulations.

Select the power cable in accordance with relevant local and national regulations. For the maximum running current of the backup heater, refer to the table below.

Door 2: electrical parts of the hydraulic compartment: **X10M**



1 Earth leakage circuit breaker

2 Fuse

Model	Backup heater capacity	Backup heater nominal voltage	Maximum running current	Z_{max} (Ω)
V3[(a) (b)]	6 kW	1x 230 V	26 A	0.29
W1	6 kW	3x 400 V	8.6 A	—
V3[(c)]	3 kW	1x 230 V	13 A	—
W1	2 kW	3x 400 V	5.0 A	—

(a) Equipment complying with EN/IEC 61000-3-12[(1)]
(b) This equipment complies with EN/IEC 61000-3-11[(2)] provided that the system impedance Z_{sys} is less than or equal to Z_{max} at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a system impedance Z_{sys} less than or equal to Z_{max}.
(c) Refer to procedure how to set the backup heater to lower capacity.

NOTE The earth leakage circuit breaker must be a high-speed type breaker of 30 mA (<0.1 s).

Procedure

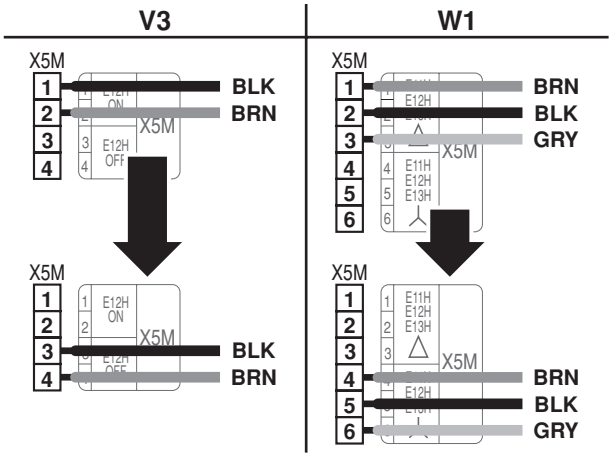
1 Using the appropriate cable, connect the power circuit to the main circuit breaker as shown on the wiring diagram and in figure 2.

2 Connect the earth conductor (yellow/green) to the earthing screw on the X1M terminal.

3 Fix the cable with cable ties to the cable tie mountings to ensure strain relief. (Positions are marked with in figure 2.)

Note: only relevant field wiring is shown.

4 If the backup heater capacity is to be set lower than the default value (6 kW), this can be done by reconnecting wires according to following figure. The backup heater capacity is now 3 kW for V3 models or 2 kW for W1 models.



Connection of the thermostat cable

Connection of the thermostat cable depends on the application.

See also "Typical application examples" on page 6 and "Room thermostat installation configuration" on page 19 for more information and configuration options on pump operation in combination with a room thermostat.

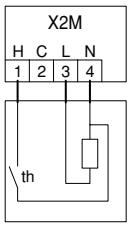
Thermostat requirements

- Power supply: 230 V AC or battery operated
- Contact voltage: 230 V.

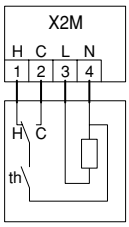
Procedure

1 Connect the thermostat cable to the appropriate terminals as shown on the wiring diagram.

Heating only thermostat



Heating/cooling thermostat



2 Fix the cable with cable ties to the cable tie mountings to ensure strain relief.

3 Set DIP switch SS2-3 on the PCB to ON. See "Room thermostat installation configuration" on page 19 for more information.

Connection of the valve control cables

Valve requirements

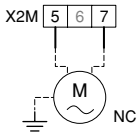
- Power supply: 230 V AC
- Maximum running current: 100 mA

Wiring the 2-way valve

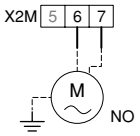
1 Using the appropriate cable, connect the valve control cable to the X2M terminal as shown on the wiring diagram.

NOTE Wiring is different for a NC (normal closed) valve and a NO (normal open) valve. Make sure to connect to the correct terminal numbers as detailed on the wiring diagram and illustrations below.

Normal closed (NC) 2-way valve



Normal open (NO) 2-way valve



2 Fix the cable(s) with cable ties to the cable tie mountings to ensure strain relief.

(1) European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase.
(2) European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤75 A.

Wiring the 3-way valve

1 Using the appropriate cable, connect the valve control cable to the appropriate terminals as shown on the wiring diagram.

Two types of 3-way valves can be connected. Wiring is different for each type:

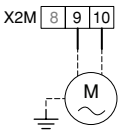
- "Spring return 2-wire" type 3-way valve

  The 3-way valve should be fitted as such that when the 3-way valve is idle (not activated), the space heating circuit is selected.

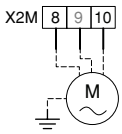
- "SPST 3-wire" type 3-way valve

  The 3-way valve should be fitted as such that when terminal ports 9 and 10 are electrified, the domestic hot water circuit is selected.

"Spring return 2-wire" valve



"SPST 3-wire" valve



2 Fix the cable(s) with cable ties to the cable tie mountings to ensure strain relief.

Connection to a benefit kWh rate power supply

Electricity companies throughout the world work hard to provide reliable electric service at competitive prices and are often authorized to bill clients at benefit rates. E.g. time-of-use rates, seasonal rates, Wärmepumpentarif in Germany and Austria, ...
This equipment allows for connection to such benefit rate power supply delivery systems.

Consult with the electricity company acting as provider at the site where this equipment is to be installed to know whether it is appropriate to connect the equipment in one of the benefit kWh rate power supply delivery systems available, if any.

When the equipment is connected to such benefit kWh rate power supply, the electricity company is allowed to:

- interrupt power supply to the equipment for certain periods of time;
- demand that the equipment only consumes a limited amount of electricity during certain periods of time.

The unit is designed to receive an input signal by which the unit switches into forced off mode. At that moment, the outdoor unit compressor will not operate.

Warnings

for a benefit kWh rate power supply like illustrated below as type 1

- If the benefit kWh rate power supply is of the type that power supply is not interrupted, then control of the heaters is still possible.

  For the different possibilities of controlling heaters at moments that benefit kWh rate is active, refer to "[D] Benefit kWh rate power supply" on page 26.

  If heaters must be controlled at moments that the benefit kWh rate power supply is off, then these heaters shall be connected to a separate power supply.

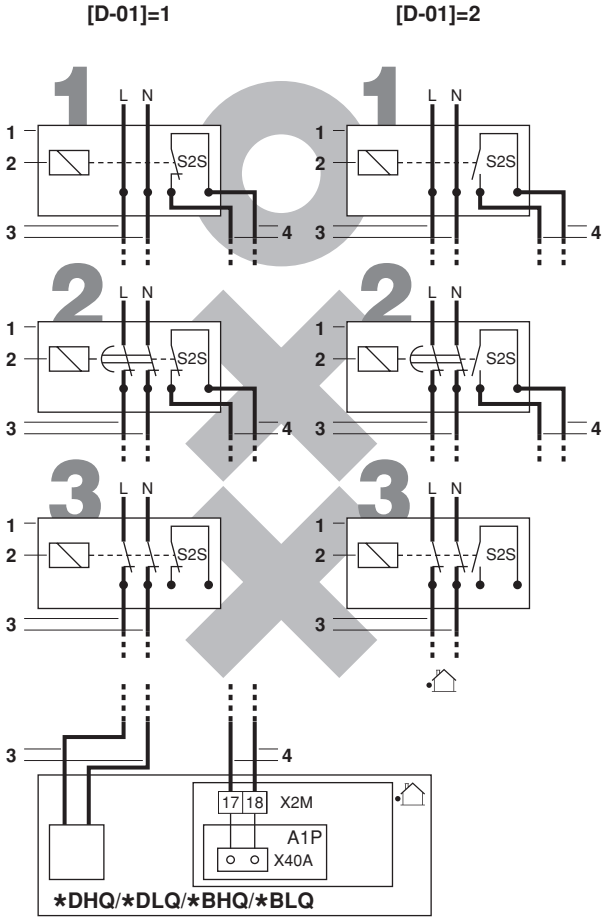
- During the period that the benefit kWh rate is active and power supply is continuous, then stand-by power consumption is possible (PCB, controller, pump, ...).

for a benefit kWh rate power supply like illustrated below as types 2 or 3

Benefit kWh rate power supplies that completely shut power supply are not allowed for this application because of the water freeze prevention that would not be powered.

Possible types of benefit kWh rate power supply

Possible connections and requirements to connect the equipment to such power supply are illustrated in the figure below:



1	Benefit kWh rate power supply box
2	Receiver controlling the signal of the electricity company
3	Power supply to outdoor unit
4	Voltage free contact
o	Allowed
x	Not allowed

When the outdoor unit is connected to a benefit kWh rate power supply, the voltage free contact of the receiver controlling the benefit kWh rate signal of the electricity company must be connected to clamps 17 and 18 of X2M (as illustrated in the figure above).
When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode(1).
When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode(2).

(1) When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 22.
(2) When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 22.

type 1
The benefit kWh rate power supply is of the type that power supply is not interrupted.

type 2 and 3
The benefit kWh rate power supply is of the type that power supply will be interrupted after elapse of time or is interrupted immediately.

- Benefit kWh rate power supplies that completely shut power supply like illustrated above as types 2 and 3 are not allowed for this application because of the water freeze prevention that would not be powered.
- When connecting the equipment to a benefit kWh rate power supply, change field settings [D-01] and both [D-01] and [D-00] in case the benefit kWh rate power supply is of the type that power supply is not interrupted (like illustrated above as type 1). Refer to "[D] Benefit kWh rate power supply" on page 26 of chapter "Field settings".

NOTE If the benefit kWh rate power supply is of the type that power supply is not interrupted, the unit will be forced to off. Controlling the solar pump is still possible.

Installation of the digital controller

The unit is equipped with a digital controller offering a user-friendly way to set up, use and maintain the unit. Before operating the controller, follow this installation procedure.

Wiring specifications

Wire specification	Value
Type	2 wire
Section	0.75-1.25 mm^2
Maximum length	500 m

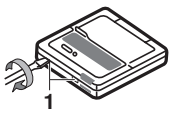
NOTE The wiring for connection is not included.

Mounting

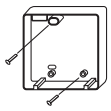
The digital controller, delivered in a kit, has to be mounted indoors.

1 Remove the front part of the digital controller.

Insert a slotted screwdriver into the slots (1) in the rear part of the digital controller, and remove the front part of the digital controller.

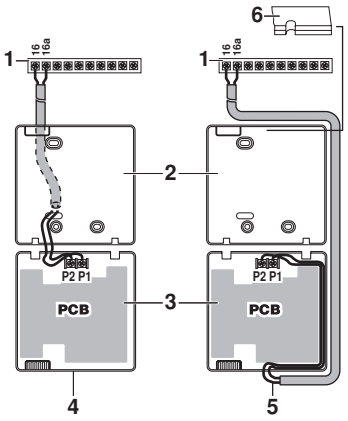


2 Fasten the digital controller on a flat surface.



NOTE Be careful not to distort the shape of the lower part of the digital controller by over tightening the mounting screws.

3 Wire the unit.

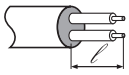


1 Unit
2 Rear part of the digital controller
3 Front part of the digital controller
4 Wired from the rear
5 Wired from the top
6 Notch the part for the wiring to pass through with nippers, etc.

Connect the terminals on top of the front part of the digital controller and the terminals inside the unit (P1 to 16, P2 to 16a).

NOTE

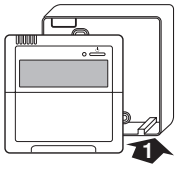
- When wiring, run the wiring away from the power supply wiring in order to avoid receiving electric noise (external noise).
- Peel the shield for the part that has to pass through the inside of the digital controller case (ℓ).



4 Reattach the upper part of the digital controller.

Be careful not to pinch the wiring when attaching.

First begin fitting from the clips at the bottom.



START-UP AND CONFIGURATION

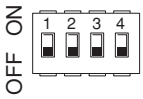
The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

It is important that **all** information in this chapter is read sequentially by the installer and that the system is configured as applicable.

DIP switch settings overview

DIP switch SS2 is located on the switch box PCB (see "Switch box main components (door 2)" on page 9) and allows configuration of domestic hot water tank installation, room thermostat connection and pump operation.

Switch off the power supply before opening the switch box service panel and making any changes to the DIP switch settings.

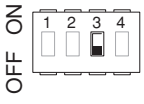


DIP switch SS2	Description	ON	OFF
1	Not applicable for installer	—	(Default)
2	Domestic hot water tank installation (see "Domestic hot water tank installation configuration" on page 20)	Installed	Not installed (Default)
3	Room thermostat connection (see "Room thermostat installation configuration" on page 19)	Room thermostat connected	No room thermostat connected (Default)
4	This setting[a] decides the operation mode when there is a simultaneous demand for more space heating/cooling and domestic water heating.	Heating/cooling priority	No priority (Default)

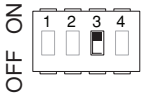
(a) only applicable in case DIP switch 2 = ON

Room thermostat installation configuration

- When **no room thermostat** is connected to the unit, toggle switch SS2-3 should be set to **OFF**.



- When a **room thermostat** is connected to the unit, toggle switch SS2-3 should be set to **ON**.



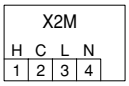
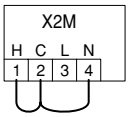
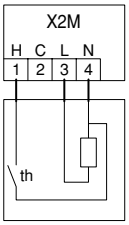
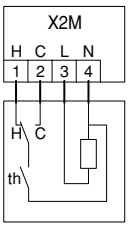
- On the room thermostat, set the hysteresis appropriately to prevent the pump from repeatedly turning on and off (i.e. chattering), and thereby impacting the lifetime of the pump.

NOTE

- When a room thermostat is connected to the unit, the heating and cooling schedule timers are never available. Other schedule timers are not affected. For more information on the schedule timers, refer to the operation manual.
- When a room thermostat is connected to the unit, and the ☀/❄ button or ❄ button is pressed, the centralised control indicator will flash to indicate that the room thermostat has priority and controls on/off operation and change over operation.

The following table summarizes the required configuration and thermostat wiring at the terminal block in the switch box. Pump operation is listed in the third column. The three last columns indicate whether the following functionality is available on the user interface (UI) or handled by the thermostat (T):

- space heating or cooling on/off (❄)
- heating/cooling changeover (☀/❄)
- heating and cooling schedule timers (🕒)

Thermostat	Configuration	Pump operation	❄	☀/❄	🕒
No thermostat	• SS2-3 = OFF • wiring: (non) 	determined by leaving water temperature [a]	UI	UI	UI
	• SS2-3 = ON • wiring: 	on when space heating or cooling is on (❄)	UI	UI	UI
Heating only thermostat	• SS2-3 = ON • wiring: 	on when heating request by room thermostat	T	—	—
Thermostat with heating/cooling switch	• SS2-3 = ON • wiring: 	on when heating request or cooling request by room thermostat	T	T	—

th = Thermostat contact
C = Cooling contact
H = Heating contact
L, N = 230 V AC

(a) The pump will stop when space heating/cooling is turned off or when the water reaches the desired water temperature as set on the user interface. With space heating/cooling turned on, the pump will then run every 5 minutes during 3 minutes to check the water temperature.

Pump operation configuration

NOTE

To set the pump speed, refer to "Setting the pump speed" on page 20.

Without room thermostat

When no thermostat is connected to the unit, pump operation will be determined by the leaving water temperature.

To force continuous pump operation when no room thermostat is connected do the following:

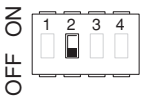
- set toggle switch SS2-3 to ON,
- short-circuit the terminal numbers 1-2-4 on the terminal block in the switch box.

With room thermostat

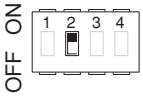
When a thermostat is connected to the unit, the pump will operate continuously whenever there is heating or cooling demand requested by the thermostat.

Domestic hot water tank installation configuration

- When **no domestic hot water tank** is installed, toggle switch SS2-2 should be set to **OFF** (default).



- When a **domestic hot water tank** is installed, toggle switch SS2-2 should be set to **ON**.



Initial start-up at low outdoor ambient temperatures

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in cracking of concrete floors due to rapid temperature change. Please contact the responsible cast concrete building contractor for further details.

To do so, the lowest leaving water set temperature can be decreased to a value between 15°C and 25°C by adjusting the field setting [9-01] (heating set point lower limit). Refer to "Field settings" on page 21.

NOTE Heating between 15°C and 25°C is performed by the backup heater only.

Pre-operation checks

Checks before initial start-up

Switch off the power supply before making any connections.

After the installation of the unit, check the following before switching on the circuit breaker:

1 Field wiring

Make sure that the field wiring between local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), and unit and domestic hot water tank has been carried out according to the instructions described in the chapter "Field wiring" on page 12, according to the wiring diagrams and according to European and national regulations.

2 Fuses or protection devices

Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter "Technical specifications" on page 33. Make sure that neither a fuse nor a protection device has been bypassed.

3 Booster heater circuit breaker F2B

Do not forget to turn on the booster heater circuit breaker F2B in the switch box (applies only to units with optional domestic hot water tank installed).

4 Earth wiring

Make sure that the earth wires have been connected properly and that the earth terminals are tightened.

5 Internal wiring

Visually check the switch box on loose connections or damaged electrical components.

6 Fixation

Check that the unit is properly fixed, to avoid abnormal noises and vibrations when starting up the unit.

7 Damaged equipment

Check the inside of the unit on damaged components or squeezed pipes.

8 Refrigerant leak

Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, call your local dealer.

9 Power supply voltage

Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.

10 Air purge valve

Make sure the air purge valve is open (at least 2 turns).

11 Pressure relief valve

Check if the backup heater vessel is completely filled with water by operating the pressure relief valve. It should purge water instead of air.

Operating the system with the backup heater vessel not completely filled with water will damage the backup heater!

12 Shut-off valves

Make sure that the shut-off valves are fully open.

Operating the system with closed valves will damage the pump!

Powering up the unit

When power supply to the unit is turned on, "88" is displayed on the user interface during its initialisation, which might take up to 30 seconds. During this process the user interface cannot be operated.

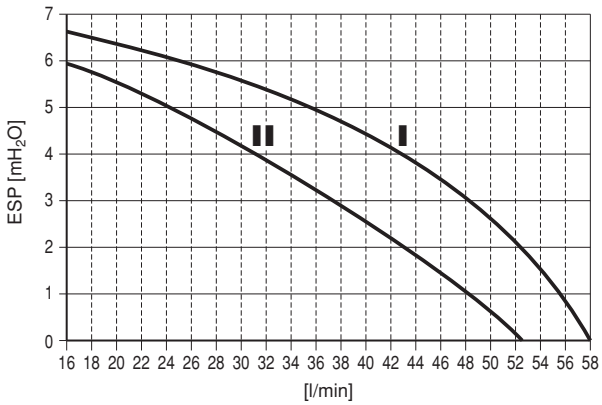
Setting the pump speed

The pump speed can be selected on the pump (see "Main components" on page 8).

The default setting is high speed (**I**). If the water flow in the system is too high (e.g., noise of running water in the installation) the speed can be set to low speed (**II**).

NOTE The speed dial on the pump indicates 3 speed settings. However, only 2 speed settings exist: low speed and high speed. The indicated medium speed setting on the speed dial is equal to low speed.

The available external static pressure (ESP, expressed in mH_2O) in function of the water flow (l/min) is shown in the graph below.



Failure diagnosis at the moment of first installation

- In case nothing is displayed on the remote controller (the current set temperature does not display), check for any of the following abnormalities before you can diagnose possible malfunction codes.
  - Disconnection or wiring error (between power supply and unit and between unit and remote controller).
  - The fuse on the PCB may have run out.
- If the remote controller shows *"E3"*, *"E4"* or *"L8"* as an error code, there is a possibility that either the stop valves are closed, or that air inlet or air outlet are blocked.
- If the error code *"U2"* is displayed on the remote controller, check for voltage imbalance.
- If the error code *"L4"* is displayed on the remote controller, it is possible that air inlet or air outlet are blocked.
- The reversed phase protection detector of this product only works during the initialisation stage after a power reset.

  The reversed phase protection detector is designed to stop the product in case of an abnormality when the product is started up.
  - When the reversed phase protection circuit forced the unit to stop, check if all phases are existing. If this is the case, shut off the power supply to the unit and replace two of three phases. Turn on power again and start the unit.
  - Reversed phase detection is not performed while the product is operating.
  - In case of possible reversal of phases after a momentary black out of power and the power goes on and off while the product is operating, install a reversed phase protection circuit on site. Such situation is not unimaginable when using generators. Running the product in reversed phase can break the compressor and other parts.
- For a missing phase in case of W1 units, *"E7"* or *"U2"* will be displayed on the remote controller of the unit.

  Operation will be impossible with either one of these phenomena. If this happens, turn off the power, re-check the wiring and switch the position of two of the three electrical wires.

Field settings

The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user demand. Thereto, a number of so called field settings are available. These field settings are accessible and programmable through the user interface.

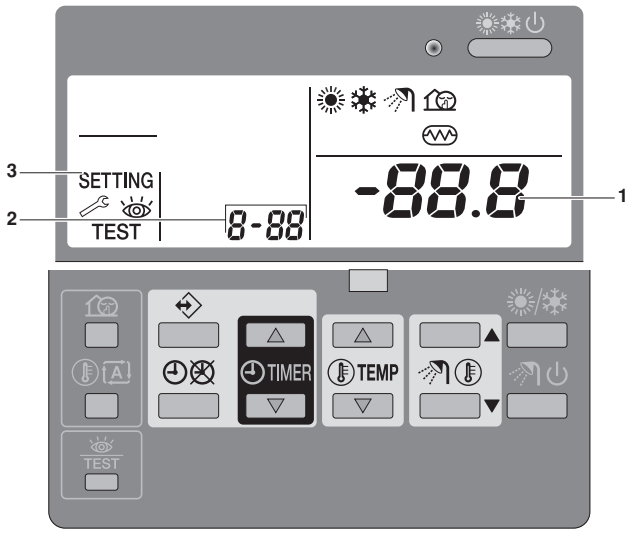
Each field setting is assigned a 3-digit number or code, for example [5-03], which is indicated on the user interface display. The first digit [5] indicates the 'first code' or field setting group. The second and third digit [03] together indicate the 'second code'.

A list of all field settings and default values is given under "Field settings table" on page 27. In this same list, we provided for 2 columns to register the date and value of altered field settings at variance with the default value.

A detailed description of each field setting is given under "Detailed description" on page 22.

Procedure

To change one or more field settings, proceed as follows.



1 Press the TEST button for a minimum of 5 seconds to enter FIELD SET MODE.
The **SETTING** icon (3) will be displayed. The current selected field setting code is indicated *8-88* (2), with the set value displayed to the right *-88.8* (1).

2 Press the TEMP▲ button to select the appropriate field setting first code.

3 Press the TEMP▼ button to select the appropriate field setting second code.

4 Press the TIMER▲ button and TIMER▼ button to change the set value of the select field setting.

5 Save the new value by pressing the ⊗ button.

6 Repeat step 2 through 4 to change other field settings as required.

7 When finished, press the TEST button to exit FIELD SET MODE.

NOTE Changes made to a specific field setting are only stored when the ⊗ button is pressed. Navigating to a new field setting code or pressing the TEST button will discard the change made.

NOTE
- Before shipping, the set values have been set as shown under "Field settings table" on page 27.
- When exiting FIELD SET MODE, "88" may be displayed on the user interface LCD while the unit initialises itself.

Detailed description

[0] User permission level

If required, certain user interface buttons can be made unavailable for the user.

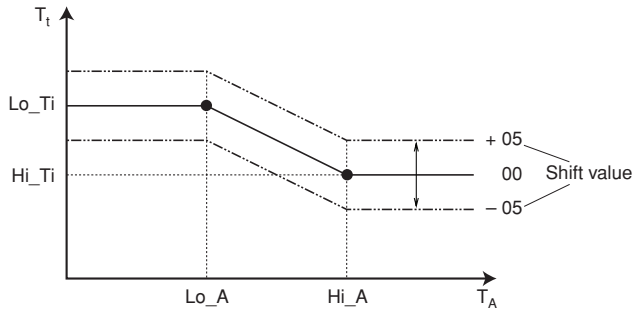
Three permission levels are defined (see the table below). Switching between level 1 and level 2/3 is done by simultaneously pressing buttons ⏲TIMER▲ and ⏲TIMER▼ immediately followed by simultaneously pressing buttons and , and keeping all 4 buttons pressed for at least 5 seconds (in normal mode). Note that no indication on the user interface is given. When level 2/3 is selected, the actual permission level — either level 2 or level 3 — is determined by the field setting [0-00].

		Permission level		
Button		**1**	**2**	**3**
Quiet mode button		operable	—	—
Weather dependent set point button		operable	—	—
Schedule timer enable/disable button		operable	operable	—
Programming button		operable	—	—
Time adjust buttons	⏲TIMER ▲ ⏲TIMER ▼	operable	—	—
Inspection/test operation button	TEST	operable	—	—

[1] Weather dependent set point (heating operation only)

The weather dependent set point field settings define the parameters for the weather dependent operation of the unit. When weather dependent operation is active the water temperature is determined automatically depending on the outdoor temperature: colder outdoor temperatures will result in warmer water and vice versa. During weather dependent operation, the user has the possibility to shift up or down the target water temperature by a maximum of 5°C. See the operation manual for more details on weather dependent operation.

- [1-00] Low ambient temperature (Lo_A): low outdoor temperature.
- [1-01] High ambient temperature (Hi_A): high outdoor temperature.
- [1-02] Set point at low ambient temperature (Lo_Ti): the target outgoing water temperature when the outdoor temperature equals or drops below the low ambient temperature (Lo_A).
  Note that the Lo_Ti value should be *higher* than Hi_Ti, as for colder outdoor temperatures (i.e. Lo_A) warmer water is required.
- [1-03] Set point at high ambient temperature (Hi_Ti): the target outgoing water temperature when the outdoor temperature equals or rises above the high ambient temperature (Hi_A).
  Note that the Hi_Ti value should be *lower* than Lo_Ti, as for warmer outdoor temperatures (i.e. Hi_A) less warm water suffices.



T_t Target water temperature

T_A Ambient (outdoor) temperature

Shift value = Shift value

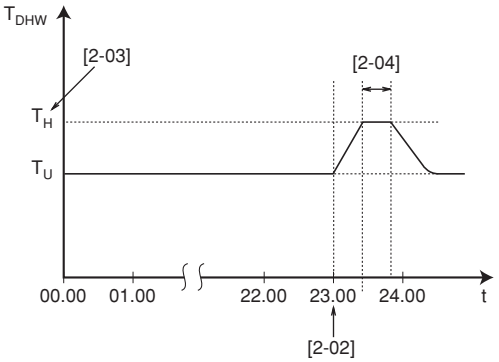
[2] Disinfection function

Applies only to installations with a domestic hot water tank.

The disinfection function disinfects the domestic hot water tank by periodically heating the domestic water to a specific temperature.

The disinfection function field settings must be configured by the installer according to national and local regulations.

- [2-00] Operation interval: day(s) of the week at which the domestic water should be heated.
- [2-01] Status: defines whether the disinfection function is turned on (1) or off (0).
- [2-02] Start time: time of the day at which the domestic water should be heated.
- [2-03] Set point: high water temperature to be reached.
- [2-04] Interval: time period defining how long the set point temperature should be maintained.



T_{DHW} Domestic hot water temperature

T_U User set point temperature (as set on the user interface)

T_H High set point temperature [2-03]

t Time

[3] Auto restart

When power returns after a power supply failure, the auto restart function reapplies the user interface settings at the time of the power supply failure.

NOTE It is therefore recommended to leave the auto restart function enabled.

Note that with the function disabled the schedule timer will not be activated when power returns to the unit after a power supply failure. Press the ⏲⊗ button to enable the schedule timer again.

- [3-00] Status: defines whether the auto restart function is turned **ON (0)** or **OFF (1)**.

NOTE If the benefit kWh rate power supply is of the type that power supply is interrupted, then always allow the auto restart function.

[4] Backup heater operation and space heating off temperature

Backup heater operation

The operation of the backup heater can altogether be enabled or disabled, or it can be disabled depending on operation of the booster heater.

- [4-00] Status: defines whether backup heater operation is enabled (1) or disabled (0).

> **NOTE** Even in case the backup heater operation status field setting [4-00] is set to disabled (0), the backup heater can operate during start-up and defrost operation.

- [4-01] Priority: defines whether backup heater and booster heater can operate simultaneously (0), or if the booster heater operation has priority over the backup heater operation (1), or if the backup heater operation has priority over the booster heater operation (2).

> **NOTE** When the priority field setting is set to ON (1), space heating performance of the system might be decreased at low outdoor temperatures, since in case of domestic water heating demand the backup heater will not be available for space heating (space heating will still be provided by the heat pump).
>
> When the priority field setting is set to ON (2), domestic water heating performance of the system might be decreased at low outdoor temperatures, since in case of space heating demand the booster heater will not be available for domestic water heating. However domestic water heating by heatpump will still be available.
>
> When the priority field setting is set to OFF (0), make sure that electrical power consumption does not exceed supply limits.

Space heating off temperature

- [4-02] Space heating off temperature: outdoor temperature above which space heating is turned off, to avoid overheating.
- [4-03] Booster heater operation: defines whether the optional booster heater operation is enabled (1) or limited (0).

> **NOTE** If the booster heater operation is limited than the booster heater operation is only allowed during the disinfection function [2] (refer to "[2] Disinfection function" on page 22.) or when powerful domestic hot water temperature is initiated (refer to the operation manual).

- [4-04] Freeze-up protection function: avoids the freeze-up of the water piping between home and unit. In case of low ambient temperatures it will activate the pump and in case of low water temperatures it will additionally activate the backup heater.
  Default freeze-up protection function takes into account freezing of water piping which is unsuficiently insulated.
  Basically it means that the pump is activated whenever ambient temperatures become close to freezing, independantly of the working temperature.
  - However, if the installer can guarantee that the complete installation is protected from freezing sufficiently with a minimum thickness of 13 mm and x≤0,040 W/mK insulation material, then a lower level of freeze-up protection, that will reduce the pump running time, can be set.
  - If the water system contains glycol, then a lower level of freeze-up protection, that will reduce the pump running time, can be set.

  For more information contact your local dealer.

[5] Equilibrium temperature and space heating priority temperature

Equilibrium temperature — The 'equilibrium temperature' field settings apply to operation of the **backup heater**.
When the equilibrium temperature function is enabled, operation of the backup heater is restricted to low outdoor temperatures, i.e. when the outdoor temperature equals or drops below the specified equilibrium temperature. When the function is disabled, operation of the backup heater is possible at all outdoor temperatures. Enabling this function reduces the working time of the backup heater.

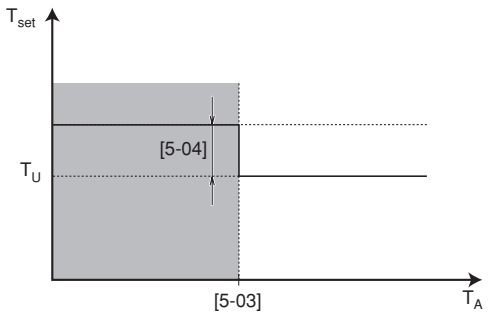
- [5-00] Equilibrium temperature status: specifies whether the equilibrium temperature function is enabled (1) or disabled (0).
- [5-01] Equilibrium temperature: outdoor temperature below which operation of the backup heater is allowed.

Space heating priority temperature — Applies only to installations with a domestic hot water tank. — The 'space heating priority temperature' field settings apply to operation of the 3-way valve and the **booster heater** in the domestic hot water tank.
When the space heating priority function is enabled, it is assured that the full capacity of the heat pump is used for space heating only when the outdoor temperature equals or drops below the specified space heating priority temperature, i.e. low outdoor temperature. In this case the domestic water will only be heated by the booster heater.

- [5-02] Space heating priority status: specifies whether space heating priority is enabled (1) or disabled (0).
- [5-03] Space heating priority temperature: outdoor temperature below which the domestic water will be heated by the booster heater only, i.e. low outdoor temperature.

> **NOTE** If the booster heater operation is limited ([4-03]=0) and the ambient outdoor temperature T_A is lower than the field setting to which parameter [5-03] is set, then the domestic water will not be heated.

- [5-04] Set point correction for domestic hot water temperature: set point correction for the desired domestic hot water temperature, to be applied at low outdoor temperature when space heating priority is enabled. The corrected (higher) set point will make sure that the *total* heat capacity of the water in the tank remains approximately unchanged, by compensating for the colder bottom water layer of the tank (because the heat exchanger coil is not operational) with a warmer top layer.



T_{set}	Domestic hot water set point temperature
T_U	User set point (as set on the user interface)
T_A	Ambient (outdoor) temperature
	Space heating priority

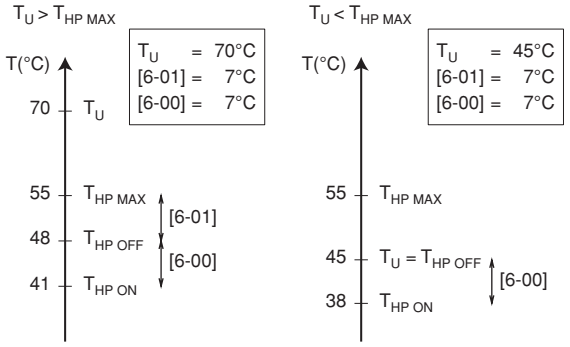
[6] DT for domestic water heating

Applies only to installations with a domestic hot water tank.

The 'DT (delta temperature) for domestic water heating' field settings determine the temperatures at which heating of the domestic water by the heat pump will be started (i.e., the heat pump ON temperature) and stopped (i.e., the heat pump OFF temperature).
When the domestic hot water temperature drops below the heat pump ON temperature ($T_{HP\ ON}$), heating of the domestic hot water by the heat pump will be started. As soon as the domestic hot water temperature reaches the heat pump OFF temperature ($T_{HP\ OFF}$) or the user set point temperature (T_U), heating of the domestic water by the heat pump will be stopped (by switching the 3-way valve).

The heat pump OFF temperature, and the heat pump ON temperature, and its relation with field settings [6-00] and [6-01] are explained in the illustration below.

- [6-00] Start: temperature difference determining the heat pump ON temperature ($T_{HP\ ON}$). See illustration.
- [6-01] Stop: temperature difference determining the heat pump OFF temperature ($T_{HP\ OFF}$). See illustration.



T_U	User set point temperature (as set on the user interface)
$T_{HP\ MAX}$	Maximum heat pump temperature at sensor in domestic hot water tank (55°C)
$T_{HP\ OFF}$	Heat pump OFF temperature
$T_{HP\ ON}$	Heat pump ON temperature

NOTE

$T_{HP\ MAX}$ is a theoretical value. In reality the maximum tank temperature that can be reached with the heat pump is 53°C. It is advised to select $T_{HP\ OFF}$ not higher than 48°C in order to improve performance of the heat pump during domestic water heating mode.

[7] Domestic hot water step length

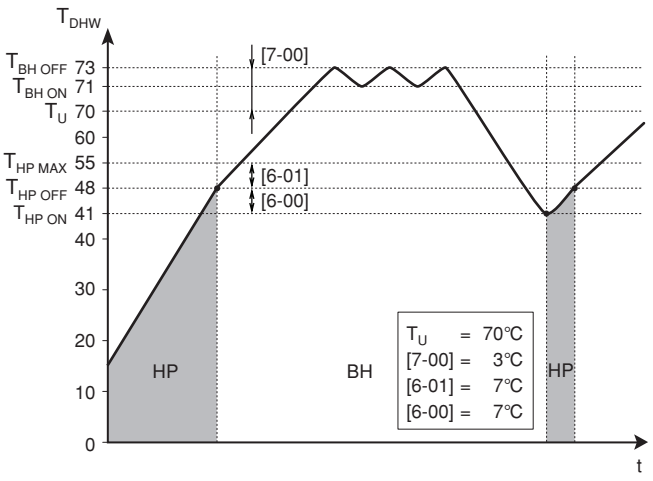
Applies only to installations with a domestic hot water tank.

When the domestic water is heated and the domestic hot water set point temperature (as set by the user) has been reached, the booster heater will continue to heat the domestic water to a temperature a few degrees above the set point temperature, i.e. the booster heater OFF temperature. These extra degrees are specified by the domestic hot water step length field setting. Correct setting prevents the booster heater from repeatedly turning on and off (i.e. chattering) to maintain the domestic hot water set point temperature. Note: the booster heater will turn back on when the domestic hot water temperature drops 2°C (fixed value) below the booster heater OFF temperature.

NOTE

If the schedule timer for booster heater (see the operation manual) is active, the booster heater will only operate if allowed by this schedule timer.

- [7-00] Domestic hot water step length: temperature difference above the domestic hot water set point temperature before the booster heater is turned off.



BH	Booster heater
HP	Heat pump. If heating up time by the heat pump takes too long, auxiliary heating by the booster heater can take place
$T_{BH\ OFF}$	Booster heater OFF temperature (T_U + [7-00])
$T_{BH\ ON}$	Booster heater ON temperature ($T_{BH\ OFF}$ – 2°C)
$T_{HP\ MAX}$	Maximum heat pump temperature at sensor in domestic hot water tank
$T_{HP\ OFF}$	Heat pump OFF temperature ($T_{HP\ MAX}$ – [6-01])
$T_{HP\ ON}$	Heat pump ON temperature ($T_{HP\ OFF}$ – [6-00])
T_{DHW}	Domestic hot water temperature
T_U	User set point temperature (as set on the user interface)
t	Time

NOTE

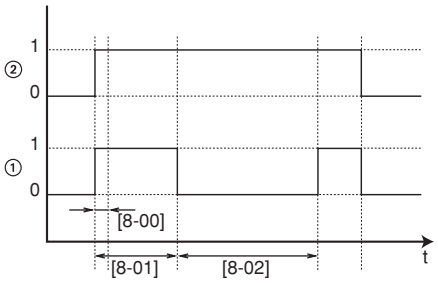
If the booster heater operation is limited ([4-03]=0), then set point of field setting parameter [7-00] has no meaning.

[8] Domestic water heating mode timer

Applies only to installations with a domestic hot water tank.

The 'domestic water heating mode timer' field settings defines the minimum and maximum domestic water heating times, and minimum time between two domestic water heating cycli.

- [8-00] Minimum running time: specifies the minimum time period during which domestic water heating should be activated, even when the target domestic water temperature has already been reached.
- [8-01] Maximum running time: specifies the maximum time period during which domestic water heating can be activated, even when the target domestic hot water temperature has not yet been reached.
  Note that when the unit is configured to work with a room thermostat (refer to "Room thermostat installation configuration" on page 19), the maximum running timer will only be taken into account when there is a request for space cooling or space heating. When there is no request for room cooling or room heating, domestic water heating by the heat pump will continue until the 'heat pump OFF temperature' (see field settings [5]) is reached. When no room thermostat is installed, the timer is always taken into account.
- [8-02] Anti-recycling time: specifies the minimum required interval between two domestic water heating cycli.

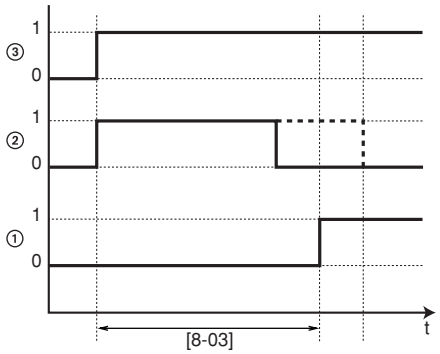


1 Domestic water heating (1 = active, 0 = not active)
2 Hot water request (1 = request, 0 = no request)
t Time

NOTE

If the outdoor temperature is higher than the field setting to which parameter [4-02] is set, then field settings of parameters [8-01] and [8-02] are not considered.

- [8-03] Booster heater delay time: specifies the start-up time delay of the booster heater operation after start of the heat pump domestic water heating operation.



1 Booster heater operation (1 = active, 0 = not active)
2 Heat pump domestic hot water operation (1 = request, 0 = no request)
3 Hot water request (1 = request, 0 = no request)
t Time

NOTE

- Take care that [8-03] is always smaller than the maximum running time [8-01].
- By adapting the booster heater delay time versus the maximum running time, an optional balance can be found between the energy efficiency and the heat up time.
- However, if the booster heater delay time is set too high, it might take a long time before the domestic hot water reaches its set temperature upon domestic hot water mode request.

Example

	Energy saving settings	Quick heating settings (default)
[8-01]	20~95 min	30 min
[8-03]	20~95 min	20 min

[9] Cooling and heating set points

The purpose of this field setting is to prevent the user from selecting a wrong (i.e., too hot or too cold) leaving water temperature. Thereto the heating temperature set point range and the cooling temperature set point range available to the user can be configured.

- In case of a floor heating application, it is important to limit the maximum leaving water temperature at heating operation according to the specifications of the floor heating installation.
- In case of a floor cooling application, it is important to limit the minimum leaving water temperature at cooling operation (field setting of parameter [9-03]) to 16~18°C to prevent condensation on the floor.

- [9-00] Heating set point upper limit: maximum leaving water temperature for heating operation.
- [9-01] Heating set point lower limit: minimum leaving water temperature for heating operation.
- [9-02] Cooling set point upper limit: maximum leaving water temperature for cooling operation.
- [9-03] Cooling set point lower limit: minimum leaving water temperature for cooling operation.
- [9-04] Overshoot setting: defines how much the water temperature may rise above the setpoint before the compressor stops. This function is only applicable in heating mode.

[A] Quiet mode

This field setting allows to select the desired quiet mode. Two quiet modes are available: quiet mode A and quiet mode B.

In quiet mode A, priority is given to the unit operating quietly under **all** circumstances. Fan and compressor speed (and thus performance) will be limited to a certain percentage of the speed at normal operation. In certain cases, this might result in reduced performance.

In quiet mode B, quiet operation might be overridden when higher performance is required. In certain cases, this might result in less quiet operation of the unit to meet the requested performance.

- [A-00] Quiet mode type: defines whether quiet mode A (0) or quiet mode B (2) is selected.
- [A-01] Parameter 01: do not change this setting. Leave it set to its default value.

Do not set other values than the ones mentioned.

[C] Solar priority mode

- [C-00] For information concerning the EKSOLHW solar kit, refer to the installation manual of that kit.
- [C-01] Defines the logic of the alarm output on the EKRP1H remote alarm input/output PCB.

  If [C-01]=0, the alarm output will be powered when an alarm occurs (default).

  If [C-01]=1, the alarm output will not be powered when an alarm occurs. This field setting allows for distinction between detection of an alarm and detection of a power failure to the unit.

[C-01]	Alarm	No alarm	No power supply to unit
0 (default)	Closed output	Open output	Open output
1	Open output	Closed output	Open output

[D] Benefit kWh rate power supply

- [D-00] Defines which heaters are switched off when the benefit kWh rate signal of the electricity company is received.

  If [D-01]=1 or 2 and the benefit kWh rate signal of the electricity company is received, following devices will be switched off:

[D-00]	Compressor	Back up heater	Booster heater
0 (default)	Forced off	Forced off	Forced off
1	Forced off	Forced off	Permitted
2	Forced off	Permitted	Forced off
3	Forced off	Permitted	Permitted

NOTE [D-00] settings 1, 2 and 3 are only meaningful if the benefit kWh rate power supply is of the type that power supply is not interrupted,

- [D-01] Defines whether or not the outdoor unit is connected to a benefit kWh rate power supply.

  If [D-01]=0, the unit is connected to a normal power supply (default value).

  If [D-01]=1 or 2, the unit is connected to a benefit kWh rate power supply. In this case the wiring requires specific installation like explained in "Connection to a benefit kWh rate power supply" on page 17.

  When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode(1).
  When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode(2).

[E] Unit information readout

- [E-00] Readout of the software version (example: 23)
- [E-01] Readout of the EEPROM version (example: 23)
- [E-02] Readout of the unit model identification (example: 11)
- [E-03] Readout of the liquid refrigerant temperature
- [E-04] Readout of the inlet water temperature

NOTE [E-03] and [E-04] readouts are not permanently refreshed. Temperature readouts are updated after looping through the field setting first codes again only.

(1) When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 22.
(2) When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 22.

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
0	**User permission level**									
	00	User permission level					3	2/3	1	—
1	**Weather dependent set point**									
	00	Low ambient temperature (Lo_A)					–10	–20~5	1	°C
	01	High ambient temperature (Hi_A)					15	10~20	1	°C
	02	Set point at low ambient temperature (Lo_TI)					40	25~55	1	°C
	03	Set point at high ambient temperature (Hi_TI)					25	25~55	1	°C
2	**Disinfection function**									
	00	Operation interval					Fri	Mon~Sun, All	—	—
	01	Status					1 (ON)	0/1	—	—
	02	Start time					23:00	0:00~23:00	1:00	hour
	03	Set point					70	40~80	5	°C
	04	Interval					10	5~60	5	min
3	**Auto restart**									
	00	Status					0 (ON)	0/1	—	—
4	**Backup heater operation and space heating off temperature**									
	00	Status					1 (ON)	0/1/2	—	—
	01	Priority					0 (OFF)	0/1	—	—
	02	Space heating off temperature					25	14~25	1	°C
	03	Booster heater operation					1	0/1	—	—
	04	Freeze-up protection function					0 (active) Read only	—	—	—
5	**Equilibrium temperature and space heating priority temperature**									
	00	Equilibrium temperature status					1 (ON)	0/1	—	—
	01	Equilibrium temperature					0	–15~35	1	°C
	02	Space heating priority status					0 (OFF)	0/1	—	—
	03	Space heating priority temperatures					0	–15~20	1	°C
	04	Set point correction for domestic hot water temperature					10	0~20	1	°C
6	**DT for domestic water heating**									
	00	Start					5	1~20	1	°C
	01	Stop					2	2~10	1	°C
7	**Domestic hot water step length**									
	00	Domestic hot water step length					0	0~4	1	°C
8	**Domestic water heating mode timer**									
	00	Minimum running time					5	0~20	1	min
	01	Maximum running time					30	5~95	5	min
	02	Anti-recycling time					3	0~10	0.5	hour
	03	Booster heater delay time					20	20~95	5	min
9	**Cooling and heating set point ranges**									
	00	Heating set point upper limit					55	37~55	1	°C
	01	Heating set point lower limit					15	15~37	1	°C
	02	Cooling set point upper limit					22	18~22	1	°C
	03	Cooling set point lower limit					5	5~18	1	°C
	04	Overshoot setting					2	1~4	1	°C
A	**Quiet mode**									
	00	Quiet mode type					0	0/2	—	—
	01	Parameter 01					3	—	—	—

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
C	**Solar priority mode**									
	00	Solar priority mode setting					0	0/1	1	—
	01	Output logic of the EKRP1H remote alarm input/output PCB					0	0/1	—	—
D	**Benefit kWh rate power supply**									
	00	Switching off heaters					0	0/1/2/3	—	—
	01	Unit connection to benefit kWh rate power supply					0 (OFF)	0/1/2	—	—
	02	Not applicable. Do not change the default value!					0	—	—	—
E	**Unit information readout**									
	00	Software version					Read only	—	—	—
	01	EEPROM version					Read only	—	—	—
	02	Unit model identification					Read only	—	—	—
	03	Liquid refrigerant temperature					Read only	—	—	°C
	04	Inlet water temperature					Read only	—	—	°C

TEST RUN AND FINAL CHECK

The installer is obliged to verify correct operation of unit after installation.

Automatic test run

When the unit is put into operation (by pressing the button) for the first time, the system will automatically perform a test run in cooling mode. The test run will take up to 3 minutes, during which no specific indication is given on the user interface.

During the automatic test run, it is important to ensure that the water temperature does not drop below 10°C, which might activate the freeze-up protection and thereby prevent the test run to finish.
Should the water temperature drop below 10°C, press the button so the icon is displayed. This will activate the backup heater during the automatic test run and raise the water temperature sufficiently.

If the automatic test run has ended successfully, the system will automatically resume normal operation.

If there are misconnections or malfunctions, an error code will be displayed on the user interface. To resolve the error codes, see "Error codes" on page 31.

NOTE

When the outdoor unit is put into pump down operation, the automatic test run flag will be cleared. The next time the system is put into operation, the automatic test run will be executed again.

Test run operation (manual)

If required, the installer can perform a manual test run operation at any time to check correct operation of cooling, heating and domestic water heating.

Procedure

1 Push the button 4 times so the **TEST** icon will be displayed.

2 Depending on the unit model, heating operation, cooling operation or both must be tested as follows (when no action is performed, the user interface will return to normal mode after 10 seconds or by pressing the button once):
- To test the heating operation push the button so the icon is displayed. To start the test run operation press the button.
- To test the cooling operation push the button so the icon is displayed. To start the test run operation press the button.
- To test the domestic water heating operation push the button. The test run operation will start without pressing the button.

3 The test run operation will end automatically after 30 minutes or when reaching the set temperature. The test run operation can be stopped manually by pressing the button once. If there are misconnections or malfunctions, an error code will be displayed on the user interface. Otherwise, the user interface will return to normal operation.

4 To resolve the error codes, see "Error codes" on page 31.

NOTE

To display the last resolved error code, push the button 1 time. Push the button again 4 times to return to normal mode.

NOTE

It is not possible to perform a test run if a forced operation from the unit is in progress. Should forced operation be started during a test run, the test run will be aborted.

Final check

Before switching on the unit, read following recommendations:

- When the complete installation and all necessary settings have been carried out, close all front panels of the unit and refit the unit cover.
- The service panel of the switch box may only be opened by a licensed electrician for maintenance purposes.

NOTE

Note that during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

MAINTENANCE

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

- Before carrying out any maintenance or repair activity, always switch off the circuit breaker on the supply panel, remove the fuses or open the protection devices of the unit.
- Make sure that before starting any maintenance or repair activity, also the power supply to the unit is switched off.

The described checks must be executed at least **once a year** by qualified personnel.

1 Water pressure

Check if the water pressure is above 0.3 bar. If necessary add water.

2 Water filter

Clean the water filter.

3 Water pressure relief valve

Check for correct operation of the pressure relief valve by turning the red knob on the valve counter-clockwise:
- If you do not hear a clacking sound, contact your local dealer.
- In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.

4 Pressure relief valve hose

Check that the pressure relief valve hose is positioned appropriately to drain the water.

5 Backup heater vessel insulation cover

Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.

6 Domestic hot water tank pressure relief valve (field supply)

Applies only to installations with a domestic hot water tank.
Check for correct operation of the pressure relief valve on the domestic hot water tank.

7 Domestic hot water tank booster heater

Applies only to installations with a domestic hot water tank.

It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.

8 Unit switch box

- Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.
- Check for correct operation of contactors K1M, K3M, K5M (applications with domestic hot water tank only) and K4M by use of an ohmmeter. All contacts of these contactors must be in open position.

9 In case of use of glycol

Document the glycol concentration and the pH-value in the system at least once a year.

- A pH-value below 8.0 indicates that a signifcant portion of the inhibitor has been depleted and that more inhibitor needs to be added.
- When the pH-value is below 7.0 then oxidation of the glycol occured, the system should be drained and flushed thoroughly before severe damage occurs.

Make sure that the disposal of the glycol solution is done in accordance with relevant local and national legislation.

TROUBLESHOOTING

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit.

General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

Before contacting your local dealer, read this chapter carefully, it will save you time and money.

When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances safety devices may be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local dealer.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve, to avoid water dripping out of the unit!

NOTE For problems related to the optional solar kit for domestic water heating, refer to the troubleshooting in the installation manual of that kit.

General symptoms

Symptom 1: The unit is turned on (LED is lit) but the unit is not heating or cooling as expected

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the controller set point.
The water flow is too low.	• Check that all shut off valves of the water circuit are completely open. • Check if the water filter needs cleaning. • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be >0.3 bar (water is cold), >>0.3 bar (water is hot). • Check that the pump speed setting is on the highest speed. • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump (refer to "Setting the pump speed" on page 20).
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to "Checking the water volume and expansion vessel pre-pressure" on page 10).

Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)

POSSIBLE CAUSES	CORRECTIVE ACTION
The unit must start up out of its operation range (the water temperature is too low).	In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (15°C). • Check that the backup heater power supply is correct. • Check that the backup heater thermal fuse is closed. • Check that the backup heater thermal protector is not activated. • Check that the backup heater contactors are not broken.
The benefit kWh rate power supply settings and electrical connections do not match.	If [D-01]=1 or 2, the wiring requires specific installation like illustrated in "Connection to a benefit kWh rate power supply" on page 17. Other correctly installed configurations are possible, but are to be specific for the type of benefit kWh rate power supply type at this specific site.
The benefit kWh rate signal was sent by the electricity company.	Wait for the power to return.

Symptom 3: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	• Check on the manometer that there is sufficient water pressure. The water pressure must be >0.3 bar (water is cold), >>0.3 bar (water is hot). • Check that the manometer is not broken. • Check that the expansion vessel is not broken. • Check that the setting of the pre-pressure of the expansion vessel is correct (refer to "Setting the pre-pressure of the expansion vessel " on page 11).

Symptom 4: The water pressure relief valve opens

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken.	Replace the expansion vessel.
The water volume in the installation is too high.	Make sure that the water volume in the installation is under the maximum allowed value (refer to "Checking the water volume and expansion vessel pre-pressure" on page 10).

Symptom 5: The water pressure relief valve leaks

POSSIBLE CAUSES	CORRECTIVE ACTION
Dirt is blocking the water pressure relief valve outlet.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockwise: • If you do not hear a clacking sound, contact your local dealer. • In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.

Symptom 6: The user interface displays "NOT AVAILABLE" when pressing certain buttons

POSSIBLE CAUSES	CORRECTIVE ACTION
The current permission level is set to a level that prevents using the pressed button.	Change the "user permission level" field setting ([0-00], see "Field settings" on page 21.

Symptom 7: Space heating capacity shortage at low outdoor temperatures

POSSIBLE CAUSES	CORRECTIVE ACTION
Backup heater operation is not activated.	Check that the "backup heater operation status" field setting [4-00] is turned on, see "Field settings" on page 21. Check whether or not the thermal protector of the backup heater has been activated (refer to Main components, "Backup heater thermal protector" on page 9 for location of the reset button). Check if booster heater and backup heater are configured to operate simultaneously (field setting [4-01], see "Field settings" on page 21) Check whether or not the thermal fuse of the backup heater is blown (refer to "Main components", "Backup heater thermal fuse" on page 9 for location of the reset button).
The backup heater equilibrium temperature has not been configured correctly.	Raise the 'equilibrium temperature' field setting [5-01] to activate backup heater operation at a higher outdoor temperature.
Too much heat pump capacity is used for heating domestic hot water (applies only to installations with a domestic hot water tank).	Check that the 'space heating priority temperature' field settings are configured appropriately: • Make sure that the 'space heating priority status' field setting [5-02] is enabled. • Raise the 'space heating priority temperature' field setting [5-03] to activate booster heater operation at a higher outdoor temperature.

Error codes

When a safety device is activated, the user interface LED will be flashing, and an error code will be displayed.

A list of all errors and corrective actions can be found in the table below.

Reset the safety by turning the unit OFF and back ON.

Instruction to turn the unit OFF			
User interface mode (heating/cooling ☀/❄)	**Domestic water heating mode (🚿)**	**Push the ▬ button**	**Push the 🚿 ⏻ button**
ON	**ON**	1 time	1 time
ON	**OFF**	1 time	—
OFF	**ON**	—	1 time
OFF	**OFF**	—	—

In case this procedure for resetting the safety is not successful, contact your local dealer.

Error code	Failure cause	Corrective action
80	Inlet water temperature thermistor failure (inlet water thermistor broken)	Contact your local dealer.
81	Outlet water temperature thermistor failure (outlet water temperature sensor broken)	Contact your local dealer.
89	Water heat exchanger freeze-up failure (due to water flow too low)	Refer to error code 7H.
	Water heat exchanger freeze-up failure (due to refrigerant shortage)	Contact your local dealer.
7H	Flow failure (water flow too low or no water flow at all, minimum required water flow is 16 l/min)	• Check that all shut off valves of the water circuit are completely open. • Check if the water filter needs cleaning. • Check that the unit is operating within its operating range (refer to "Technical specifications " on page 33). • Also refer to "Charging water " on page 12. • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be >0.3 bar (water is cold), >>0.3 bar (water is hot). • Check that the pump speed setting is on the highest speed. • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump (refer to "Setting the pump speed " on page 20). • If this error occurs at defrost operation (during space heating or domestic water heating), make sure that the backup heater power supply is wired correctly and that fuses are not blown. • If EKHWSU version of domestic hot water tank is installed, check if the setting of the additional thermostat in the tank switch box is correct (≥50°C). • Check that the pump fuse (FU2) and PCB fuse (FU1) are not blown.
8H	Outlet water temperature of unit too high (>65°C)	• Check that the contactor of the electric backup heater is not short circuited. • Check that the outlet water thermistor is giving the correct read out.
A1	Hydraulic PCB defective	Contact your local dealer.
A5	Too low (during cooling operation) or too high (during heating operation) refrigerant temperature (measured by R13T)	Contact your local dealer.

Error code	Failure cause	Corrective action
AA	Booster heater thermal protector is open (applies only to installations with a domestic hot water tank)	Reset the thermal protector
	Secondary thermal protector is open (applies only to units with a EKHWSU domestic hot water tank installed)	Reset the thermal protector
	Backup heater thermal protector is open	Reset the thermal protector by pressing the reset button (refer to "Main components" on page 8 for location of the reset button)
	Check the reset button of the thermal protector. If both the thermal protector and the controller are reset, but the AA error code persists, the backup heater thermal fuse has blown.	Contact your local dealer.
C0	Flow switch failure (flow switch remains closed while pump is stopped)	Check that the flow switch is not clogged with dirt.
C4	Heat exchanger thermistor failure (heat exchanger temperature sensor broken)	Contact your local dealer.
E1	Compressor PCB defective	Contact your local dealer.
E3	Abnormal high pressure	Check that the unit is operating within its operating range (refer to "Technical specifications" on page 33). Contact your local dealer.
E4	Actuation of low pressure sensor	Check that the unit is operating within its operating range (refer to "Technical specifications" on page 33). Contact your local dealer.
E5	Overload activation of compressor	Check that the unit is operating within its operating range (refer to "Technical specifications" on page 33). Contact your local dealer.
E7	Fan lock failure (fan is locked)	Check if the fan is not obstructed by dirt. If the fan is not obstructed, contact your local dealer.
E9	Malfunction of electronic expansion valve	Contact your local dealer.
EC	Domestic hot water temperature too high (>89°C)	• Check that the contactor of the electric booster heater is not short circuited. • Check that the domestic hot water thermistor is giving the correct read out.
F3	Too high discharge temperature (e.g. due to outdoor coil blockage)	Clean the outdoor coil. If the coil is clean, contact your local dealer.
H3	Malfunctioning HPS system	Contact your local dealer.
H9	Outdoor temperature thermistor failure (outdoor thermistor is broken)	Contact your local dealer.
HC	Domestic hot water tank thermistor failure	Contact your local dealer.
J1	Malfunction of pressure sensor	Contact your local dealer.
J3	Discharge pipe thermistor failure	Contact your local dealer.
J5	Suction pipe unit thermistor failure	Contact your local dealer.
J6	Aircoil thermistor frost detection failure	Contact your local dealer.
J7	Aircoil thermistor mean temperature failure	Contact your local dealer.
J8	Liquid pipe unit thermistor failure	Contact your local dealer.
L4	Electric component failure	Contact your local dealer.
L5	Electric component failure	Contact your local dealer.
L8	Electric component failure	Contact your local dealer.
L9	Electric component failure	Contact your local dealer.
LC	Electric component failure	Contact your local dealer.

Error code	Failure cause	Corrective action
P1	PCB failure	Contact your local dealer.
P4	Electric component failure	Contact your local dealer.
PJ	Failure of capacity setting	Contact your local dealer.
U0	Refrigerant failure (due to refrigerant leak)	Contact your local dealer.
U1	Power supply cables are connected in the reverse phase instead of the normal phase.	Connect the power supply cables in normal phase. Change any two of the three power supply cables (L1, L2 , L3) to correct phase.
U2	Main circuit voltage failure	Contact your local dealer.
U4	Communication failure	Contact your local dealer.
U5	Communication failure	Contact your local dealer.
U7	Communication failure	Contact your local dealer.
UA	Communication failure	Contact your local dealer.

TECHNICAL SPECIFICATIONS

General

	V3 models (1~)						W1 models (3N~)					
	ED_011	ED_014	ED_016	EB_011	EB_014	EB_016	ED_011	ED_014	ED_016	EB_011	EB_014	EB_016
Nominal capacity												
• cooling	Refer to the Technical Data						Refer to the Technical Data					
• heating	Refer to the Technical Data						Refer to the Technical Data					
Dimensions H x W x D	1418 x 1435 x 382						1418 x 1435 x 382					
Weight												
• machine weight	180 kg						180 kg					
• operation weight	185 kg						185 kg					
Connections												
• water inlet/outlet	G 5/4" FBSP[a]						G 5/4" FBSP[a]					
• water drain	hose nipple						hose nipple					
• refrigerant liquid side	Ø9.5 mm (3/8 inch)						Ø9.5 mm (3/8 inch)					
• refrigerant gas side	Ø15.9 mm (5/8 inch)						Ø15.9 mm (5/8 inch)					
Expansion vessel												
• volume	10 l						10 l					
• maximum working pressure (MWP)	3 bar						3 bar					
Pump												
• type	water cooled						water cooled					
• no. of speed	2						2					
Sound pressure level[b]												
• heating	51 dBA	51 dBA	52 dBA	51 dBA	51 dBA	52 dBA	49 dBA	51 dBA	53 dBA	49 dBA	51 dBA	53 dBA
• cooling	—	—	—	50 dBA	52 dBA	54 dBA	—	—	—	50 dBA	52 dBA	54 dBA
Internal water volume	5.5 l						5.5 l					
Pressure relief valve water circuit	3 bar						3 bar					
Operation range - water side												
• heating	+15~+55°C			+15~+55°C			+15~+55°C			+15~+55°C		
• cooling	—			+5~+22°C			—			+5~+22°C		
Operation range - air side												
• heating	–15~+35°C[c]			–15~+35°C[c]			–15~+35°C[c]			–15~+35°C[c]		
• cooling	—			+10~+46°C			—			+10~+46°C		
• domestic hot water by heat pump	–15~+35°C[c]			–15~+35°C[c]			–15~+35°C[c]			–15~+35°C[c]		

(a) FBSP = Female British Standard Pipe
(b) At 1 m in front of the unit (free field condition)
(c) EDL and EBL models can reach –20°C / EDL_W1 and EBL_W1 models can reach –25°C, but this is without capacity guarantee

Electrical specifications

	V3 models (1~)	W1 models (3N~)
Standard unit (power supply via unit)		
• power supply	230 V 50 Hz 1P	400 V 50 Hz 3P
• nominal running current	—	5.8 A
Backup heater		
• power supply	See "Connection of the backup heater power supply" on page 15	
• maximum running current	See "Connection of the backup heater power supply" on page 15	

NOTES

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